

Flood Mitigation Plan

Eau Claire, Wisconsin



CITY OF EAU CLAIRE FLOOD MITIGATION PLAN

PREPARED BY:

Flood Mitigation Plan Committee

WITH ASSISTANCE BY:

West Central Wisconsin Regional Planning Commission

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SECTION I.

INTRODUCTION

PURPOSE OF THE PLAN

The City of Eau Claire Flood Mitigation Plan has been prepared as a result of the City's application for, and award of, Flood Mitigation Assistance (FMA) program grant funds. These funds are dispersed by the Federal Emergency Management Agency (FEMA) through Wisconsin Emergency Management (WEM). The purpose of the FMA program is to provide assistance to communities for activities that will reduce the risk of flood damage to structures insurable under the National Flood Insurance Program (NFIP).

The primary focus of the plan is to evaluate existing flood conditions throughout the community and recommend potential flood mitigation and land development alternatives in floodprone areas. Development of the plan will help the City locate its areas of flood risk, assess the magnitude of the risk, and develop strategies for reducing the risk. Through this process the city can address issues related to incompatible land uses in flood hazard areas, and reduce the community and taxpayer costs associated with flood damages, relief and rescue efforts. Completion and approval of the plan will also make the City of Eau Claire eligible to apply for future FMA Project grant funds enabling the city to implement some of the recommended flood mitigation strategies.

PLANNING PROCESS

In response to flood events that have taken place over the past 10 years, Eau Claire has successfully implemented flood mitigation activities in various areas throughout the community. The city has effectively utilized buyout programs in conjunction with stormwater management and public infrastructure improvements to reduce the number of structures at risk from flooding.

In order to continue to further the City's ongoing flood mitigation efforts, the City believed it was important to complete a flood mitigation plan. Completion of the plan would enable the city to evaluate the City's past mitigation activities, current flood risk and provide some guidance towards future mitigation efforts.

Development of the plan was based on the planning requirements developed by Wisconsin Emergency Management. These requirements are based on a combination of the Flood Mitigation Assistance (FMA) program and Community Rating System (CRS) Floodplain Management Planning Process requirements.

To complete the development of the plan, the City of Eau Claire contracted with the West Central Wisconsin Regional Planning Commission. In addition, the City established the Flood Mitigation Plan Committee, shown in Table 1. The Committee was responsible for overseeing the development of the plan, providing input and review of information and materials, and review and approval of drafted sections and the final draft plan.

**TABLE 1. CITY OF EAU CLAIRE
FLOOD MITIGATION PLAN DEVELOPMENT COMMITTEE**

Name	Representative of:
Lyle Koerner	Deputy Chief - Prevention, Eau Claire Fire Department
Edward Fuerbringer	Chief, Eau Claire Fire Department
Rebecca Noland	Director, Finance Department
Brian Amundson	Director, Public Works Department
John Genskow	City Engineer, Engineering Division, Public Works Department
Dale Peters	Director, Human Resources & Risk Management Departments

Development of the plan began in June 2002 and was completed with the City Council's adopting resolution passed on May 14, 2002. The general stages of plan development included: (1) initial data collection and research on the community and historic flood events and their impacts, (2) community vulnerability and risk assessment, (3) development of goals and objectives, and (4) development of appropriate flood mitigation strategies and implementation actions.

In addition to Flood Mitigation Plan Committee meetings, the City also provided opportunities for public review and comment on the plan. These activities included:

- **Public Information & Plan Review Meeting.** On April 16, 2002 a public information and plan review meeting was held to allow the public the opportunity to review and comment on the proposed plan. Advertisement of the information meeting included a general press release that prompted reports on radio and television news stations, notices placed in the local newspaper and on the local public access television station, and a direct mailing to all neighborhood associations in the city.
- **Plan Commission Public Hearing.** On May 6, 2002 the Plan Commission held a public hearing on the Flood Mitigation Plan. Advertisement of the meeting was completed using the standard Plan Commission meeting notice procedure. In addition, excerpts of the Goals and Objectives and Flood Mitigation Strategies and Action Plan sections of the plan were sent to all neighborhood associations in the city.
- **City Council Public Hearing.** On May 13, 2002 the City Council held a public hearing on the Flood Mitigation Plan.
- **City Council Meeting.** On May 14, 2002 the City Council considered and adopted the Flood Mitigation Plan.

Final drafts of the plan were also distributed for review and comment to each of the departments represented on the Flood Mitigation Plan Committee, each agency listed as potential funding source in the Flood Mitigation Strategies and Action Plan section, the regional office of Wisconsin Emergency Management, and Eau Claire County Emergency Management.

GEOGRAPHIC LOCATION

The City of Eau Claire, shown in Figure 1, is located in west-central Wisconsin. The corporate limits of the city extend over parts of two counties (Eau Claire and Chippewa), and include over 32 square miles of land area.

Eau Claire (French for “Clear Water”) is located at the confluence of the Eau Claire and Chippewa Rivers and began as a lumbering settlement during the 1840s. At that time, the Eau Claire area was one of the largest stands of white pine in North America. After the depletion of timber resources, dairy farming became the main economic activity in the county. The city grew to become the major center for health and professional services, education, retail trade and industry in the western Wisconsin region. Today the population of Eau Claire is approximately 62,000 and continues to prosper as the major trade center. The city is surrounded by fertile agricultural land, remnants of large pine forests, and scenic lakes and rivers. To this day, Eau Claire remains as the county seat of Eau Claire County.

NATURAL FEATURES AND ENVIRONMENT

As stated earlier, Eau Claire is located at the confluence of the Chippewa and Eau Claire Rivers. The city is bounded by steep, wooded hills on the northeast, south and southwest. The land surrounding the community is primarily devoted to farming and dairy operations, open fields, woodlands, wetlands and lakes. These natural features offer many outdoor recreation opportunities and provide a very scenic and attractive setting for residents.

Watersheds

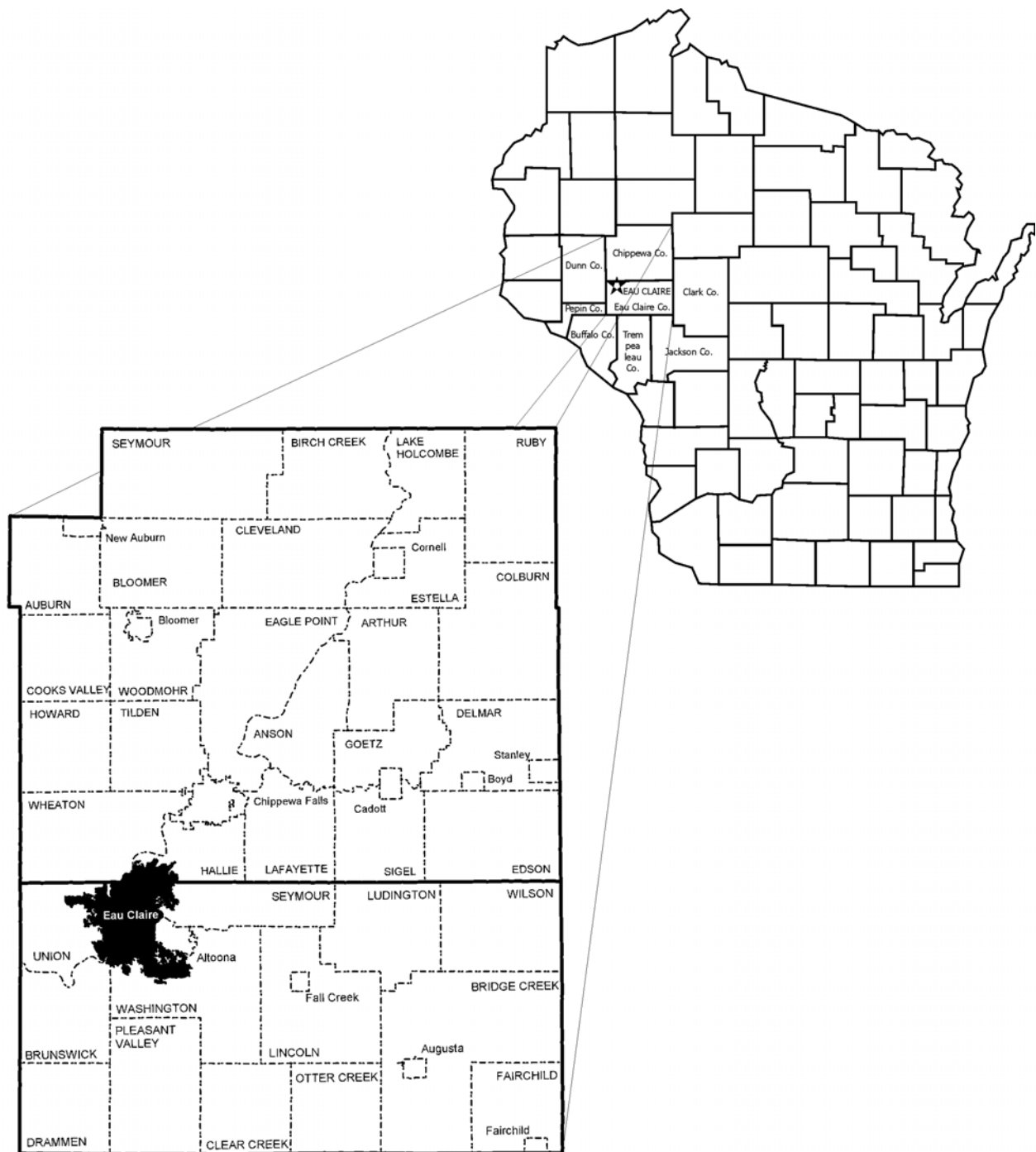
A watershed is an area of land that drains or “sheds” its water to a lake, river, stream or wetland. Some watersheds encompass several hundred square miles, while others may be small covering only a few square miles that drain into a lake. This is important to understand since the effects of nature and man-made activities in one area can have a direct impact on other areas. For example, run-off from a heavy rainfall upstream in a watershed will eventually reach the downstream part of the watershed. Shown in Figure 2, are the watersheds that are wholly or partially located within Eau Claire and Chippewa counties.

Lakes, Rivers and Streams

The main waterbodies located within the city are the Chippewa and Eau Claire Rivers. The Chippewa River flows from north-central Eau Claire, through the central part of the city, to the southwest. The Eau Claire River enters the city from the east and flows west into the Chippewa River in central Eau Claire.

Other significant water bodies include Half Moon Lake, and Lowes, Otter and Sherman Creeks. These bodies of water are shown in Figure 3.

**FIGURE 1. General Geographic Location
City of Eau Claire**

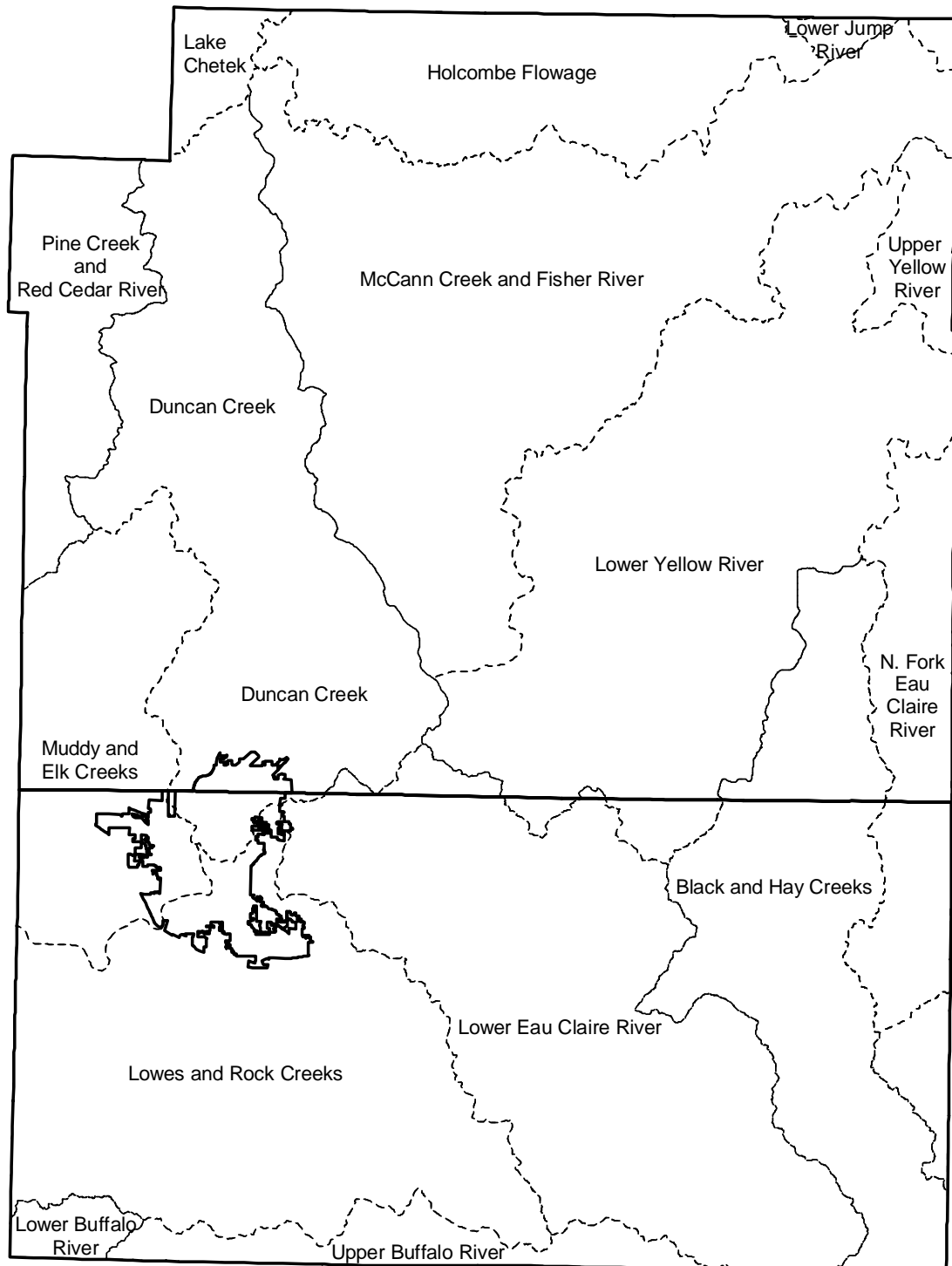


Wetlands

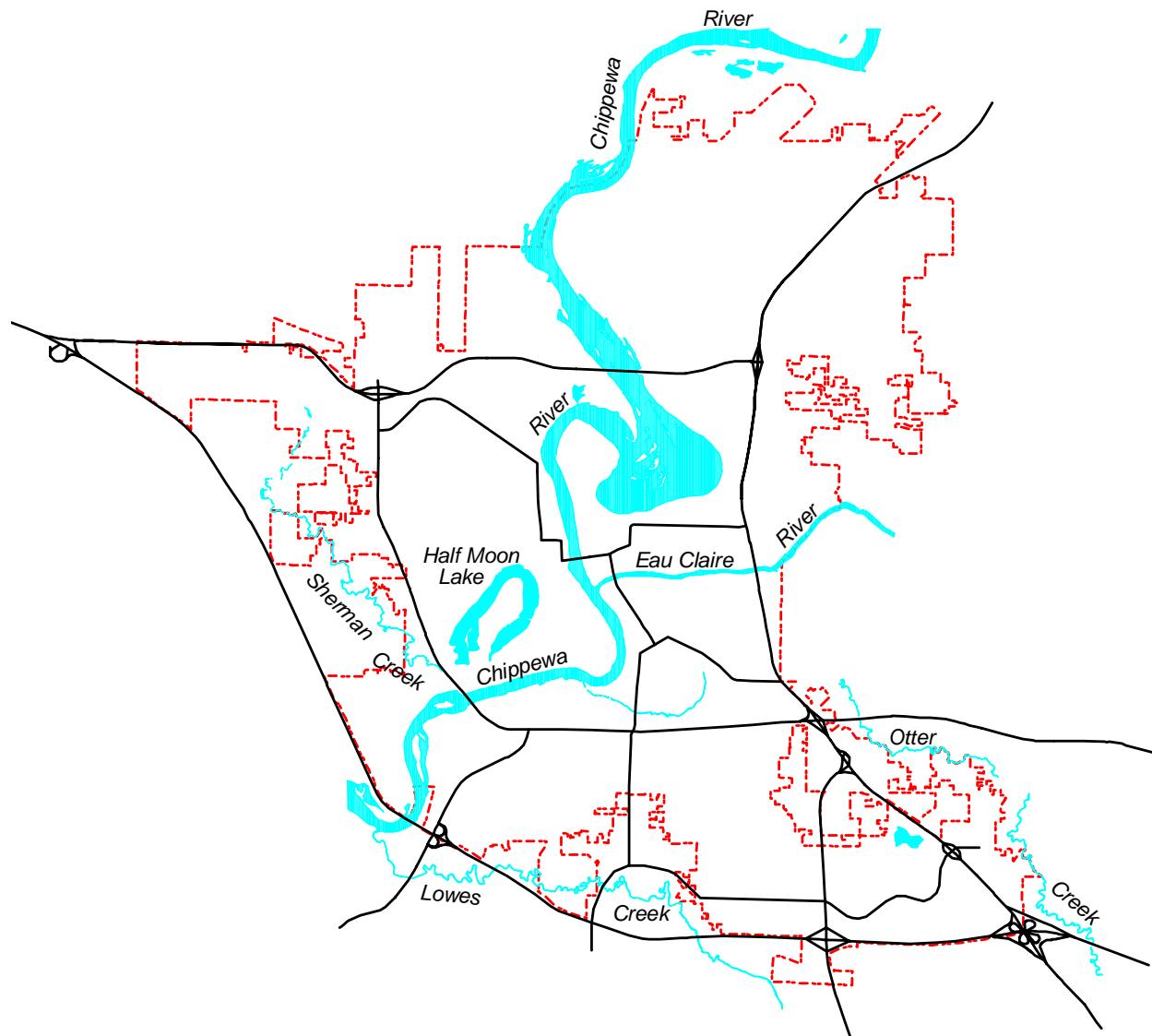
There are a number of wetland areas within the watersheds that can affect water levels of rivers and creeks flowing through Eau Claire. Wetlands are defined by the State Statute as “an area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic (water-loving) vegetation and which has soils indicative of wet

conditions.” Wetlands may be seasonal or permanent and are commonly referred to as swamps, marshes, or bogs. Wetland plants and soils have the capacity to store and filter pollutants, replenish groundwater supplies, store floodwaters and maintain stream flows.

**FIGURE 2. Watersheds
City of Eau Claire and Eau Claire and Chippewa Counties**



**FIGURE 3. Major Water Bodies
City of Eau Claire**



General Climate and Other Natural Hazards

The climate of Eau Claire is classified as mid-latitude continental. Warm humid summers and cold snowy winters are the main characteristics. The average monthly temperature ranges from 15 degrees Fahrenheit in January to 73 degrees Fahrenheit in July. Annual precipitation averages 32 inches, with approximately two-thirds of this occurring as rain. Seasonal snowfall ranges from 12 to 75 inches.

In addition to flooding, the City of Eau Claire is susceptible to other natural hazards. Since these natural hazards can occur in various locations within the city, a separate map was not prepared concerning these natural hazards. The following is a summary of other natural hazards.

THUNDERSTORMS

These are severe and violent forms of convection produced when warm moist air is overrun by dry cool air. As the warm air rises, thunderheads (cumuli-nimbus clouds) form which cause the strong winds, lightning, thunder, hail and rain associated with these storms. The National Weather Service definition of a severe thunderstorm is a thunderstorm event that produces any of the following: winds of 58 miles per hour or greater (often with gusts of 74 miles per hour or greater), hail 3/4 inch in diameter or greater, or a tornado.

The thunderheads formed may be a towering mass six miles or more across and 40,000 to 50,000 feet high. It may contain as much as 1 ½ million tons of water and enormous amounts of energy that often are released in the form of high winds, excessive rains, and three violently destructive natural elements: lightning, tornadoes, and hail (covered separately in this hazard analysis).

A thunderstorm often lasts no more than 30 minutes, as an individual thunderstorm cell frequently moves between 30 to 50 miles per hour. Strong frontal systems, though, may spawn more than one squall line composed of many individual thunderstorm cells. These fronts can often be tracked from west to east. Because thunderstorms may occur singly, in clusters, or as a portion of large storm lines, it is possible that several thunderstorms may affect you in the course of a few hours.

Severe thunderstorms can cause injury or death and can also result in substantial property damage. They may cause power outages, disrupt telephone service, and severely affect radio communications and surface/air transportation, which may seriously tax the emergency management capabilities of the affected municipalities.

**TABLE 2. Severe Thunderstorms
City of Eau Claire and Surrounding Areas**

Date	Dead	Injured	Damage
9-20-75	0	0	\$24,000 (heavy rain storm)
7-15-80	0	0	\$61,000,000+ (wind storm)
8-8-80	0	0	heavy rain
7-17-81	0	0	\$1,246,000
8-3-81	0	0	
6-2-90	0	0	80-90 mph wind damage and lightening
6-17-92	0	0	heavy winds caused power outages
5-19-96	0	0	\$581,000 downburst damage
6-29-96	0	0	\$120,000 downburst damage
10-22-96	0	0	heavy rain and flooding of rivers
7-1-97	0	0	\$200,000 heavy wind damage
5-15-98	0	0	\$73,400 heavy wind damage
5-31-98	0	0	\$467,000 heavy wind damage
6-25-98	0	0	\$117,000 heavy wind damage
6-27-98	0	0	\$37,000 heavy wind damage

Source: Eau Claire County Hazard Analysis, June 1998

In Eau Claire, there are typically two severe thunderstorms per year. Thunderstorms can occur throughout the year, with the highest frequency during the months of May through September. Shown in Table 2, is a listing of severe thunderstorms that have occurred in and around the City of Eau Claire.

LIGHTNING

Lightning is a sudden and violent discharge of electricity due to a difference in electrical charges. Lightening represents a flow of electrical current from cloud to cloud, or cloud to ground. Nationwide, lightning causes millions of dollars in damage annually; and in an average year kills more people than the total fatalities resulting from tornadoes, floods and hurricanes.

To the general public, lightning is perceived as a minor hazard. However, damage, injuries and deaths resulting from lightening indicate that it is a significant hazard. Lightning can cause extensive damage to buildings and structures, kill or injure people and livestock, start forest and wild fires, and disrupt electromagnetic transmissions.

Lightning damage results from the four effects of lightning strokes: (1) electrocution/severe shock of humans and animals, (2) vaporization of materials along the path of the lightning stroke, (3) fire caused by the high temperatures associated with lightning (as high as 50,000 degrees F), and (4) the sudden power surge which can damage electrical/electronic equipment.

Large outdoor gatherings (sporting events, concerts, campgrounds, etc.) are particularly vulnerable to lightening strikes that may result in injuries and deaths. This vulnerability underscores the importance of developing site-specific emergency procedures for these types of events, with particular emphasis on adequate early warning. Early warning of lightning hazards, combined with prudent protective actions, can greatly reduce the likelihood of lightning-related injuries and deaths.

Wisconsin has a high frequency of property losses because of lightening. Insurance records show that annually one out of every fifty farms has been struck by lightening or have had a fire that may have been caused by lightening. Generally, rural fires are more destructive than urban fires because of limited lightening protection devices, isolation, longer response times, and inadequate water supplies. The July 19, 1983 fire at Menards, which caused \$5,000,000 in damage, is believed to have started by lightening. Specific data on other dates, locations, property damage, injuries or deaths from lightening in Eau Claire are not available.

HAILSTORMS

A hailstorm is a weather condition where atmospheric water particles form into masses of ice that fall to earth. Hail is a product of strong thunderstorms that frequently move across the area. Hail normally falls near the center of the moving storm along with the heaviest rain; however, the strong winds at high altitudes can blow the hailstones away from the storm center, causing unexpected hazards at places that otherwise might not appear threatened.

Hailstones normally range from the size of a pea to that of a golf ball, but sizes larger than baseballs have occurred with the most severe storms. They form when sub-freezing temperatures cause water in thunderstorm clouds to accumulate in layers around an icy core.

When strong underlying winds no longer can support their weight, the hailstones fall earthward. Hail tends to fall in swaths that may be 20 to 115 miles long and 5 to 30 miles wide. The swath is not normally a large, continuous bombardment of hail, but generally consists of a series of hail strikes that are produced by individual thunderstorm clouds traversing the same general area. Hail strikes are typically one-half mile wide and five miles long. They may partially overlap, but often leave completely undamaged gaps between them.

Hailstorms are considered formidable among the weather and climatic hazards to property and crops of the interior plains of the U.S. because they dent vehicles and structures, break windows, damage roofs, and batter crops to the point that significant agricultural losses result. Serious injury and loss of human life, however, are rarely associated with hailstorms.

Hailstorms usually occur from May through August. Most of the hail damage is in the rural areas, as the peak hail occurrences are during the growing and harvesting seasons for most crops. Shown in Table 3, is a listing of hail damage that has occurred in the Eau Claire area.

**TABLE 3. Major Hail Storms
City of Eau Claire and Surrounding Areas**

Date	Location	Description
8-11-59	City of Eau Claire	Hail average 2"-5" in circumference; largest was 6.5"
7-64	n/a	Crop Damage
7-17-81	Towns of Ludington and Wilson	\$2,046,417

Source: Eau Claire County Hazard Analysis, June 1998

TORNADOES AND DOWNBURSTS

A tornado is a relatively short-lived local storm composed of an intense rotating column of air, extending from a thunderstorm cloud system. It is nearly always visible as a funnel, although its lower end does not necessarily touch the ground. Average winds in a tornado, although never accurately measured, are between 100 and 200 miles per hour; however, some tornadoes may have winds exceeding 300 miles per hour. For standardization, the following are National Weather Service definitions of tornado and associated terms:

Tornado - A violently rotating column of air that is touching the ground.

Funnel Cloud - A rapidly rotating column of air that does not touch the ground.

Downburst - A strong downdraft, initiated by a thunderstorm, which induces an outburst of straight-line winds on or near the ground. They may last anywhere from a few minutes in a small scale microburst to periods of up to 20 minutes or longer, known as a macroburst. Wind speeds in downbursts can reach 150 mph.

A tornado path averages four miles, but may reach up to 300 miles in length. Widths average 300 to 400 yards, but tornadoes have cut swaths a mile or more in width, with severe tornadoes or groups of two or three funnels traveling together. On the average, tornadoes move between 25 and 45 miles per hour, but speeds over land of up to 70 mph have been reported. Tornadoes

rarely last more than a couple of minutes over a spot more than 15 to 20 minutes in a ten mile area, but their short periods of existence do not limit their devastation of an area.

The destructive power of the tornado results primarily from its high wind velocities and sudden changes in pressure. Wind and pressure differentials probably account for 90 percent of tornado-caused damage. Since tornadoes are generally associated with severe storm systems, hail, torrential rain and intense lightning usually also accompany them. Depending on their intensity, tornadoes can uproot trees, down power lines, and destroy buildings. Flying debris can cause serious injury and death.

Downbursts are characterized by straight-line winds. Downburst damage is often highly localized and resembles that of tornadoes. There are significant interactions between tornadoes and downbursts, and a tornado's path can also be affected by downbursts. Because of this, the path of a tornado can be very unpredictable.

Wisconsin lies along the northern edge of the nation's maximum frequency belt for tornadoes (called "tornado alley" by some) which extends northeastward from Oklahoma into Iowa and then across to Michigan and Ohio. Yet tornadoes have occurred in Wisconsin in every month except February.

**TABLE 4. Tornadoes
City of Eau Claire and Surrounding Areas**

Date		Location	Description
9-10-1884	n/a		Sighted near the City of Eau Claire
5-12-1898	n/a		Damage unknown
9-21-24			Caused \$55,000 in damages with 150 dead and 26 injured
6-13-30			First recorded tornado in City of Eau Claire. Caused \$1,000,000 in damage, injured 6
6-16-79			Caused \$1,785,000 in damages
6-5-80			Caused \$110,000 in damages
7-15-80	City of Eau Claire, Town of Altoona		Caused \$63,000,000 in damages
9-12-82	City of Eau Claire, Town of Altoona		Caused \$1,538,468 in damages from at least two confirmed and surrounding tornadoes
7-3-83			Caused \$400,000 in damages
1984	Towns of Wilson and Bridge Creek		3 minor tornadoes with small damages to woods and crops
8-12-85	Town of Washington		Minor damages to farm buildings
6-86	City of Eau Claire		Tornado spotted, did not touch down

Source: Eau Claire County Hazard Analysis, June 1998

Wisconsin's tornado season runs from the beginning of April through September. The most severe tornadoes typically occur during April, May and June. Many tornadoes strike in late afternoon or early evening. However, tornadoes have occurred at other times. Personal property damage, deaths, and injuries have and will continue to occur in Wisconsin. Eau Claire has had

numerous tornadoes of varying degrees of intensity. Shown in Table 4, is a listing of tornadoes occurring in and around the City of Eau Claire.

WINTER STORMS

Winter storms can vary in size and strength, and include heavy snowstorms, blizzards, freezing rain, sleet, ice storms, and blowing and drifting snow conditions. Extremely cold temperatures accompanied by strong winds can result in wind chills that cause bodily injury such as frostbite, and death.

A variety of weather phenomena and conditions can occur during winter storms. For clarification, the following are National Weather Service approved descriptions of winter storm elements:

Heavy Snowfall - the accumulation of six or more inches of snow in a 12 hour period, or eight or more inches in a 24 hour period.

Blizzard - the occurrence of sustained wind speeds in excess of 35 miles per hour accompanied by heavy snowfall or large amounts of blowing or drifting snow.

Ice Storm - an occurrence where rain falls from warmer upper layers of the atmosphere to the colder ground, freezing upon contact with the ground and exposed objects near the ground.

Freezing Drizzle/Freezing Rain - the effect of drizzle or rain freezing upon impact on objects that have a temperature of 32 degrees Fahrenheit or below.

Sleet - solid grains or pellets of ice formed by the freezing of raindrops or the re-freezing of largely melted snowflakes. This ice does not cling to surfaces.

Wind Chill - an apparent temperature that describes the combined effect of wind and low air temperatures on exposed skin.

Much of the snowfall in Wisconsin occurs in small amounts of between one and three inches per occurrence. Heavy snowfalls, that produce at least eight to ten inches of accumulation, happen on the average only five times per season. True blizzards are rare in Wisconsin. They are more likely to occur in northwestern Wisconsin than in southern portions of the state, even though heavy snowfalls are more frequent in the southeast. However, blizzard like conditions often exist during heavy snowstorms when gusty winds cause the severe blowing and drifting of snow.

Both ice and sleet storms can occur at anytime throughout the winter season from October into April. Early and late season ice and sleet storms are generally restricted to northern Wisconsin. Otherwise, the majority of these storms occur in southern Wisconsin. In a typical winter season there are 3 to 5 freezing rain events, and a major ice storm occurs on a frequency of about once every other year. If a half-inch of rain freezes on trees and utility wires, extensive damage can occur, especially if accompanied by high winds that compound the effects of the added weight of the ice. There are also between three and five instances of glazing (less than 1/4 inch of ice) throughout the state during a normal winter.

Winter storms present a serious threat to the health and safety of affected citizens and can result in significant damage to property. This can occur when the heavy snow or accumulated ice

causes structural collapse of buildings, downs power lines severely affecting electrical power distribution, or cuts off people from assistance or services.

Ice and sleet storms can occur at any time throughout the winter season from November to April. Shown in Table 5, is a listing of winter storms, including blizzards, snowstorms and extreme cold, that have occurred in the Eau Claire area.

**TABLE 5. Winter Storms
City of Eau Claire and Surrounding Areas**

Date	Description
3-6-1874	18" of heavy wet snow and high drifts
3-9-1874	12" of heavy wet snow and high drifts
3-30-1920	5 feet of snow
3-30-1934	Very heavy snowfall
4-1-1934	Very heavy snowfall
12-26-1945	12" of snow with heavy drifting
12-8-1950	10" of snow with heavy drifting
1-31-1951	Temperature -45 degrees F
3-20-1951	14" of snow
1-9-1975	Heavy snowfall
1-22-1982	Heavy snowfall
3-21-1992	10.7" of snow

Source: Eau Claire County Hazard Analysis, June 1998

DROUGHT

A drought is an extended period of unusually dry weather, which may be accompanied by extreme heat (temperatures which are 10 or more degrees above the normal high temperature for the period). There are basically two types of drought in Wisconsin, agricultural and hydraulic. Agricultural drought is a dry period of sufficient length and intensity that markedly reduces crop yields. Hydrologic drought is a dry period of sufficient length and intensity to affect lake and stream levels and the height of the groundwater table. These two types of drought may, but do not necessarily, occur at the same time.

**TABLE 6. Periods of Drought
Eau Claire County**

Year	Location	Description
1976	Countywide	\$6,758,096 in crop damage
1988	Countywide	\$3,793,007 in crop damage
1989	Countywide	\$69,007 in crop damage
1990	Countywide	\$23,183
1991	Countywide	\$43,066

Source: Eau Claire County Hazard Analysis, June 1998

Droughts have the greatest impact on agriculture. Small droughts of limited duration can significantly reduce crop growth and yields. More substantial events can decimate croplands and result in total loss. Droughts also greatly increase the risk of forest fires and wildfires because of extreme dryness. In addition, the loss of vegetation in the absence of sufficient water can result in flooding, even from average rainfall, following drought conditions. Shown in Table 6, is a list drought periods for Eau Claire County.

DEMOGRAPHIC AND ECONOMIC PROFILE

According to the 2000 Census, the population of Eau Claire was 61,704. This was a 4,848 person, or 8.5% increase, from 1990. Although this rate of increase was lower than the previous three decennial periods from 1980 to 1990 (10.4%), 1970 to 1980 (15.4%), or 1960 to 1970 (17.5%), the city continues to grow at a significant rate.

TABLE 7. Historic Population • 1960 to 2000
City of Eau Claire

Year	Population	Numerical Change	Percent Change
1960	37,987		
1970	44,619	6,632	17.5%
1980	51,509	6,890	15.4%
1990	56,856	5,347	10.4%
2000	61,704	4,848	8.5%

Source: 1960, 1970, 1980, 1990, & 2000 Census

In fact, preliminary population projections, prepared by the West Central Wisconsin Regional Planning Commission, using population change during the decennial periods from 1970 through 2000 indicates a continuing trend in growth, shown in Table 8. During the 20-year period from 2000 to 2020, the City of Eau Claire is projected to increase by 13,034 people. This is an overall increase of 21.1 percent, or an average of nearly 1.1 percent annually.

TABLE 8. Population Projections • 2000 to 2020
City of Eau Claire

	2000 <i>Census</i>	2005 <i>Projection</i>	2010 <i>Projection</i>	2015 <i>Projection</i>	2020 <i>Projection</i>
Population	61,704	64,311	66,918	69,524	74,738

Source: 2000 Census; West Central Wisconsin Regional Planning Commission, October 2001

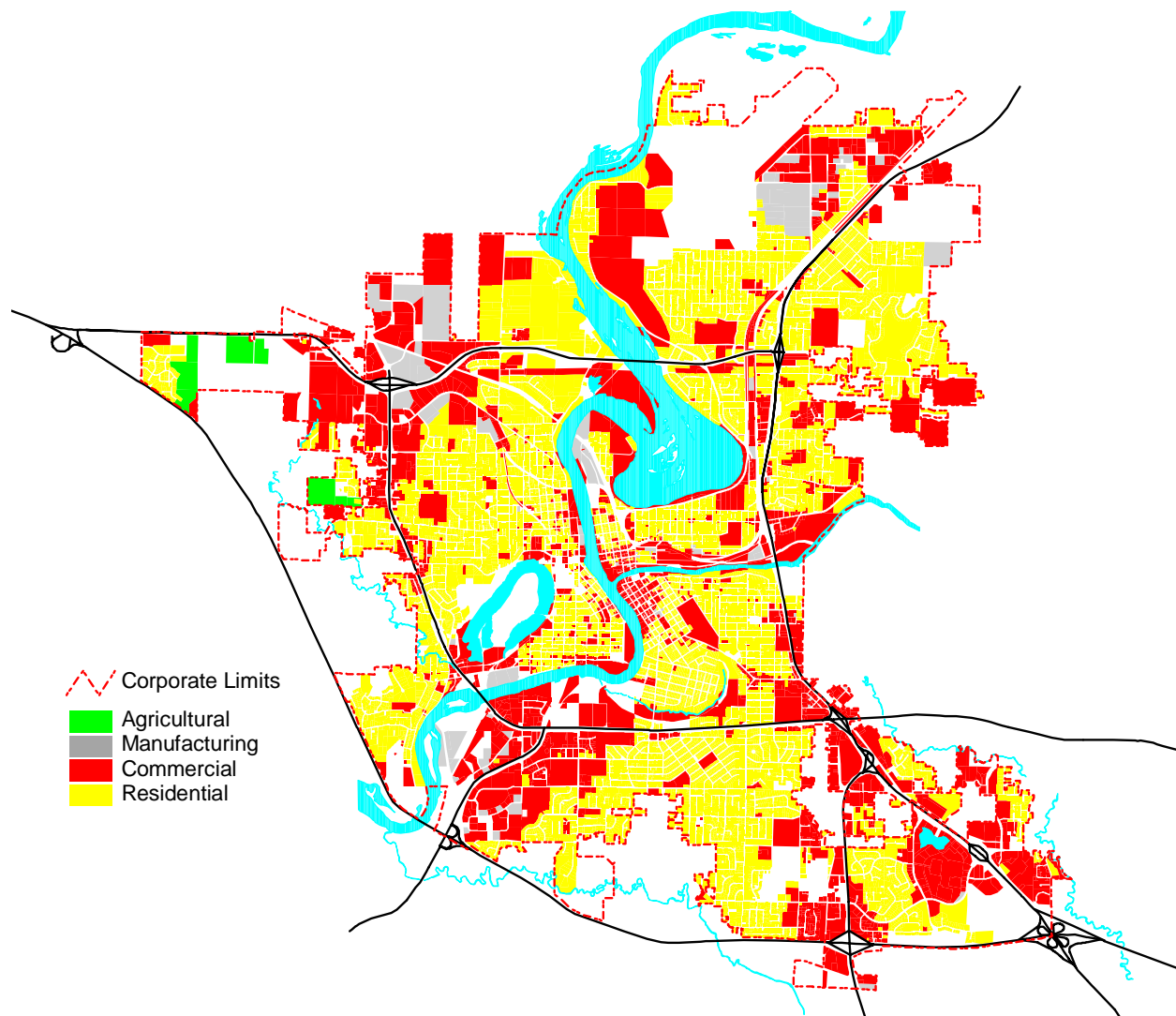
GENERAL DEVELOPMENT PATTERN

The City's current land use pattern is historically linked to the use of the region's rivers and streams for transportation during its initial settlement. The City of Eau Claire began to develop around the logging industry during the 1800s. As a result, like many communities established during this period, the city is centered on the confluence of the Chippewa and Eau Claire Rivers.

As stated earlier in the plan, Eau Claire is also a major trade center in western Wisconsin. In addition to supporting residents, businesses and industry within the city, it also provides many services and support to surrounding communities. Thus, the city has continued to prosper and grow throughout its existence.

Currently, the predominant land use within the city is residential, with major concentrations of commercial land uses located in the central, northwestern, southwestern, and southeastern areas of the city. There are also major industrial land uses located in the northwestern and northeastern parts of the city. These general land uses are shown in Figure 4.

FIGURE 4. Generalized Land Use • 2001
City of Eau Claire



Source: City of Eau Claire Property Assessment Database

Assuming that the present growth trends continue, the city of Eau Claire (urbanization) is expected to continue its expansion into the surrounding towns. This development will continue to put pressure on the shores of lakes, rivers and streams, and their associated floodplains.

SECTION III.

FLOOD HISTORY AND IMPACTS

HISTORIC FLOODING IN EAU CLAIRE

The Chippewa and Eau Claire Rivers have periodically flooded the city and affected its development. Based on historical records from the mid-1800s, Eau Claire experienced serious floods in 1838, 1847, 1855, and 1870 on the Chippewa River.

As the community began to develop further, more consistent records of flooding were kept based on measurements taken from the Grand Avenue river gauge. Although the method of recording the level of the Chippewa River has changed several times, the list of flood crest heights are shown in Table 9 and Figure 5.

The floods of 1880, 1884, and 1905 were made more severe due to the logging industry's use of the rivers in the region to carry logs to sawmills on the rivers. Logs along with other debris destroyed bridges and often formed jams that raised the level of the river behind them.

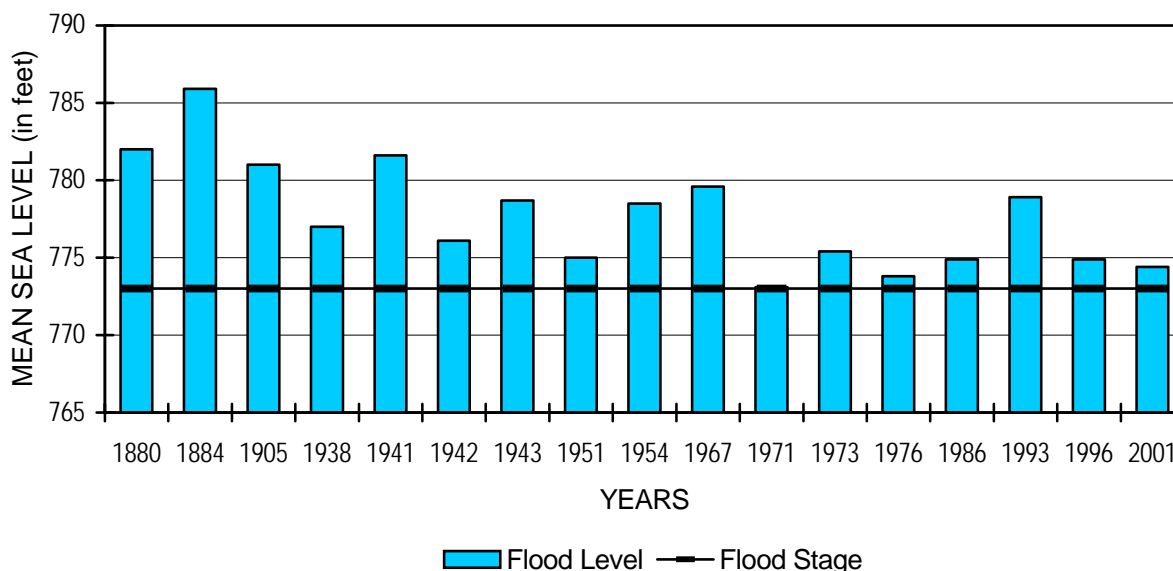
The highest flood of official record occurred on September 1, 1941. The flood was caused by extremely heavy rains that fell over the region. In Hayward, 14 inches of rainfall was recorded over 36 hours. Approximately 30 homes in the City of Eau Claire were flooded, and heavy damages occurred to businesses downtown. The approaches to the Water Street and Madison Street bridges were flooded and the bridges closed. State Highway 85 was also closed.

**TABLE 9. Recorded Flood Levels
City of Eau Claire**

Date	Crest Height	Year Flood
June 1880	782.0 (est.)	100 year
September 1884	785.9 (est.)	500 year
June 1905	781.0 (est.)	100 year
September 1938	777.0	10 year
September 1941	781.6	100 year
September 1942	776.1	10 year
June 1943	778.7	50 year
April 1951	775.0	10 year
May 1954	778.5	50 year
April 1967	779.6	50 year
April 1971	773.1	5 year
March 1973	775.4	10 year
April 1976	773.8	5 year
April 1986	774.9	10 year
June 1993	778.9	100 year
April 1996	774.9	10 year
April 2001	774.4	10 year

NOTE: Flood levels taken at the Grand Avenue river gauge. Flood stage is 773 feet mean sea level (MSL).

**FIGURE 5. Recorded Flood Levels
City of Eau Claire**



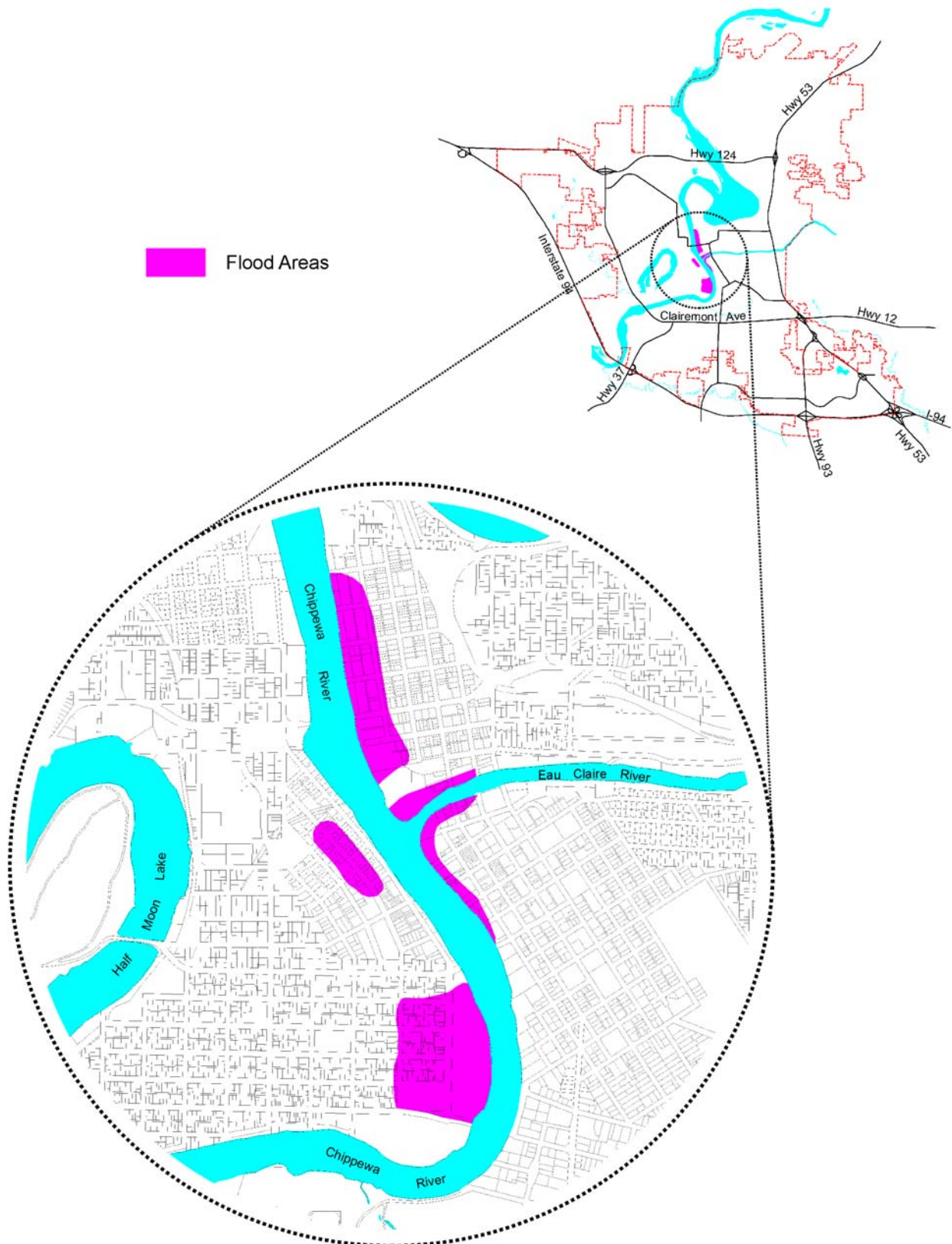
Heavy spring rains in the Chippewa and Eau Claire watersheds between April 24, and May 1, 1954 resulted in the flooding of hundreds of homes in the City of Eau Claire and flooded basements downtown. The Wisconsin State College (University of Wisconsin – Eau Claire) grounds were also flooded and Highway 85 was closed south of the city from Highway 37 to Rock Falls.

The April 1967 flood was caused by unseasonably warm weather that resulted in extremely fast snow melting. The second highest flood recorded in the City's history, it damaged 367 homes and caused \$1.5 million in damages. Flood waters covered First Avenue and flooded basements on Second Avenue; Forest and East Madison Streets were flooded; and basements were flooded in downtown businesses and on the university campus.

The conditions for the flooding which occurred on June 20-21, 1993 were initially set by precipitation that fell over the western Wisconsin during the two weeks prior to the 21st of June. On the evening of Saturday, June 19th, extremely heavy rains of more than six inches occurred in eastern Eau Claire and western Clark Counties. This event caused the Eau Claire River to rise to record levels, with a record crest of 19.38 feet recorded at the Highway K bridge near Fall Creek on June 20th, which was the 100-year flood event. The water level at the Lake Eau Claire dam rose to its regional flood level on June 20th, 10.1 feet over its normal level. Lake Altoona also rose to the regional flood level.

In addition, the Chippewa River began to rise to flood levels. On June 18th the level of the river was at 764.95 feet MSL, as measured at the Grand Avenue Bridge located near the confluence of the Chippewa and Eau Claire Rivers. By 4:00 p.m., June 20th, the river had risen above flood stage and continued rising throughout the next day to crest at 778.9 feet at 10:50 p.m. on Monday, June 21st.

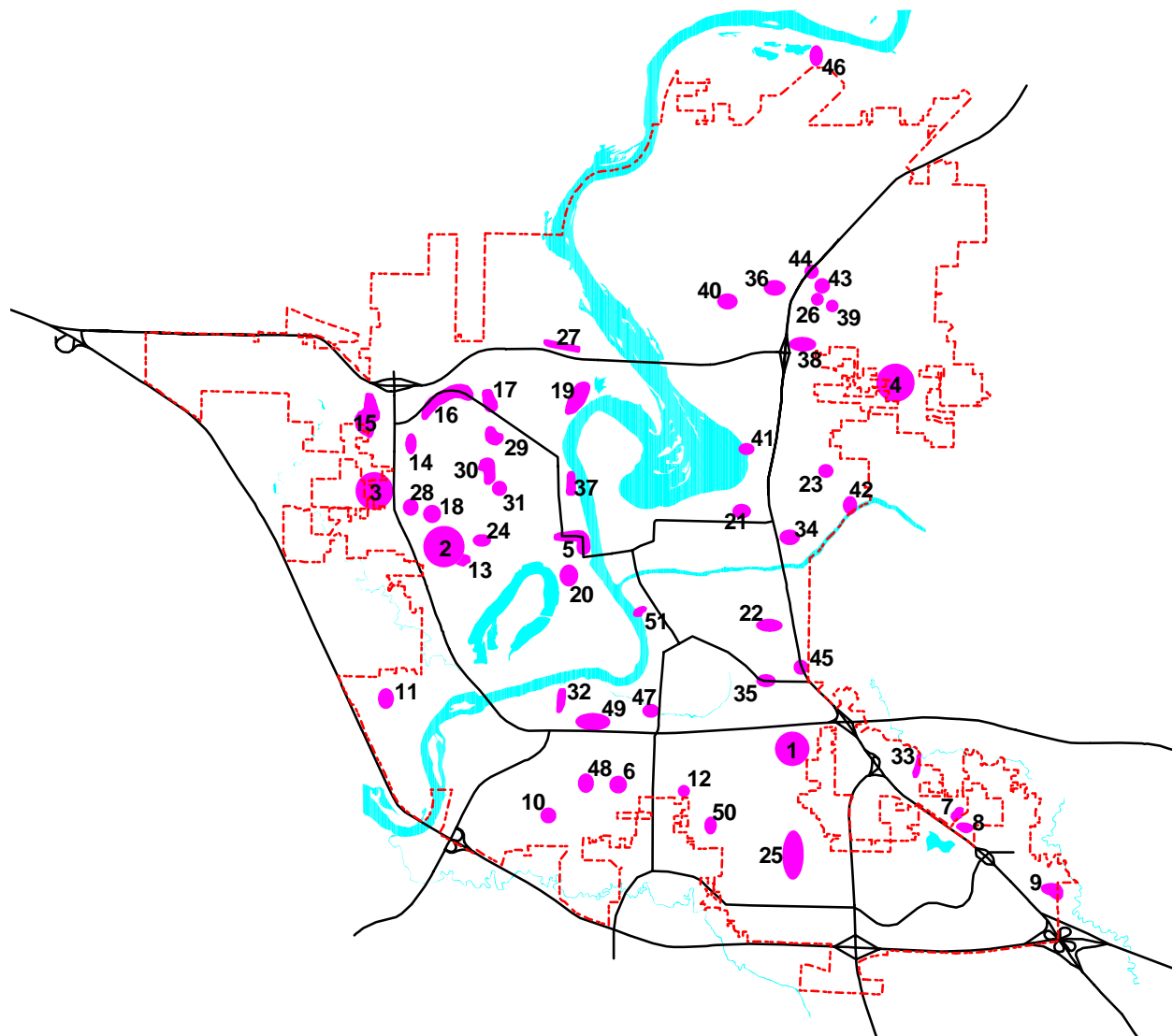
FIGURE 6. Flood Damaged Areas • June 1993
City of Eau Claire



Much of the flood damage occurred along First Avenue next to Owen Park and along Forest Street, shown in Figure 6. Several businesses suffered flooding along Graham Avenue downtown, in the East Madison Street area, and along the north bank of the Eau Claire River where it enters the Chippewa river.

The flooding in June 1993 brought a new realization that the Eau Claire River could also cause significant flooding problems in Eau Claire. Previously it was generally believed that the Chippewa River was the primary river of concern.

**FIGURE 7. Flood Damaged Areas • September 2000
City of Eau Claire**



The most recent major flood event in the City of Eau Claire occurred on September 10-11, 2000. This flood event was somewhat unique in that it was not associated with an overflow of water from any of the water bodies, but was overland flooding due to heavy rains that were unable to drain properly due to a lack of natural drainage and/or adequate public facilities. During

September 10-11, a significant rainstorm resulted in damage to more than 50 locations throughout the city, shown in Figure 7. Weather data from the Chippewa Valley Regional Airport show that this storm event resulted in nearly 8 inches of total rainfall in a 24-hour period, of which approximately 6 inches fell in a 4-hour period before midnight, shown in Table 10. Because the city received at least 6 inches of rain within a 24-hour period, this storm is considered a 100-year rainstorm.

**TABLE 10. Recorded Precipitation • September 10-11, 2000
Chippewa Valley Regional Airport**

Date	Time	Rainfall (inches)	Cumulative Rainfall
September 10, 2000	7:00 – 8:00 p.m.	0.01	0.01
	8:00 – 9:00 p.m.	1.65	1.66
	9:00 – 10:00 p.m.	1.04	2.70
	10:00 – 11:00 p.m.	2.08	4.78
	11:00 – 12:00 a.m.	1.20	5.98
September 11, 2000	12:00 – 1:00 a.m.	0.03	6.01
	1:00 – 2:00 a.m.	0.93	6.94
	2:00 – 3:00 a.m.	0.65	7.59
	3:00 – 4:00 a.m.	0.01	7.60
	3:00 – 4:00 p.m.	0.30	7.90
Total Rainfall (24-hour period)		7.90	

Source: Chippewa Valley Regional Airport, September 10-11, 2000

Although this storm affected property throughout Eau Claire, there were 4 main areas that were identified as having significant amounts of damage and the highest priority for making improvements. Two of these areas were located on the west side of Eau Claire near the intersections of Kohlhepp/Dorret (#3) and Florence/Necessity/Bell (#2), another in the southeast around the intersection of Taft/Kay streets (#1), and the fourth around the intersection of LaSalle/Gooder (#4) in northeast Eau Claire. To address the drainage issues in these areas, the city hired a consulting firm to analyze the problems and recommend solutions for each of the areas.

In addition, the city reviewed each of the remaining areas. Based on this review the City has prepared a report of proposed mitigation projects for each of the areas. The areas were then organized into high, medium, and low priorities, shown in Appendix B.

IMPACTS OF FLOODING

In general, the impacts of flood disasters can affect the people, economy, and infrastructure. For example, in June 1993, Eau Claire County was declared a Federal disaster area due to the damage caused by the 100-year flooding event. The total flood damage suffered in Eau Claire County was estimated at over \$10 million, with \$3.1 million in damage to private property, including over 250 homes and over 50 businesses, \$1.75 million in damages to public facilities, and \$5.3 million in agricultural losses.

In addition to the direct losses associated with flood events, there can also be indirect impacts such as the economic losses sustained by businesses due to damage to other sectors of the community. For example, during the 1993 flood event, the impacts of the flood damages were also experienced by area businesses related to the agricultural industry. Farming supports a variety of farm- (implement dealers, feed stores granaries, etc...) and non-farm-related (grocery stores, hardware stores, etc...) businesses and families. The 1993 flooding not only affected farmers, but also many of the businesses that support farmers.

Included in the overall damage estimates for Eau Claire County was the damages sustained by the City of Eau Claire. Flooding in the city effected nearly 200 residential and commercial properties. In addition, the city experienced damage to various public properties including local streets, bike trails, park facilities, and water and sewer facilities.

FLOODPLAIN REDEVELOPMENT

Like many other communities, water front property remains desirable. Development of shoreland property has continued, especially to the north and south along the Chippewa River. However, the City of Eau Claire does not believe that this has increased the level of risk to city residents and property. This is due primarily to the City's floodplain ordinance (Chapter 18.11 - Floodplain Overlay District), shown in Appendix C. Initially established in the late 1960s, the Floodplain Overlay District has effectively restricted the type and intensity of land uses that are allowed within floodplain areas. Generally, the City's current ordinance limits residential, commercial and industrial uses to be located within the flood fringe portion of the floodplain, as long as the structure is elevated two feet above the regional flood elevation and has dry land access. The floodway portion of the floodplain is generally limited to open space uses that do not inhibit the flow of water or that could potentially provide unnecessary risk to the health, safety and welfare of residents.

Since the development and implementation of the Floodplain Overlay District, almost no new structures have been built in the floodplain. This has resulted in the number of structures at risk from flooding and the corresponding damage potential, being reduced as structures are removed as a result of the City's flood buyout programs or separate individual property buyouts.

In response to the 1993 floods, the City of Eau Claire established a flood buyout program for those areas directly affected by the flood. In 1995, the City applied for and was awarded Hazard Mitigation Grant Program funds that comprised the bulk of the buyout program funding. In total, nearly \$2.9 million were used to purchase (52) and flood proof (2) properties. Since the completion of the grant in December 1998, the City has also acquired two additional properties through the use of general tax dollars.

Additionally, as a result of property damaged during the September 10-11, 2000 flood event, the City has committed over \$9.0 million to acquire 35 properties and make public infrastructure improvements in the affected areas. To aid in this mitigation project, the City applied for and received \$1,488,562 of Hazard Mitigation Grant Program funds for the buy out of 10 properties located in the Taft/Kay area. In fact, since 1993, the City has received over \$3.8 million of flood emergency assistance funding. In total, the two flood buyout programs are expected to result in the acquisition of 87 flood prone properties in the City of Eau Claire.

SECTION IV.

FLOOD RISK AND MITIGATION ACTIVITIES

As was stated earlier in the plan, the purpose of the flood mitigation plan is to identify areas of flood risk, assess the magnitude of the risk, and develop strategies for reducing the risk. This section of the plan will review the Eau Claire's areas at risk from flooding and the current flood mitigation activities being used to address these areas of risk. For the purposes of this plan, only those areas that fall under the city of Eau Claire's floodplain management jurisdiction are included in the flood risk assessment and review of flood mitigation activities. However, even though much development has occurred in areas adjacent to the corporate limits of the city, only those areas within the corporate limits are included in the plan.

AREAS AT RISK FROM FLOODING

The following section will outline the 100-year floodplain, structures in the floodplain, repetitive loss properties, and critical facilities in the floodplain.

100-Year Floodplain

For floodplain management purposes, FEMA has adopted the concept of the regional flood. A regional flood is a flood of a particular magnitude that may be equaled or exceeded on the average of once during any 100-year period. This means that the regional flood, commonly referred to as the 100-year flood, has a 1 percent chance of being equaled or exceeded during any year. Consequently, the 100-year floodplain is that area of land expected to be covered by floodwaters during a regional flood.

Shown in Figure 8, are the 100-year floodplain areas of Eau Claire. The floodplain areas were digitized from hand-drawn maps that were generated from digital orthophotos taken March 1993. The official floodplain zoning maps are available from the Eau Claire Zoning and Inspections Department, City Hall, 203 South Farwell, Eau Claire, Wisconsin 54703.

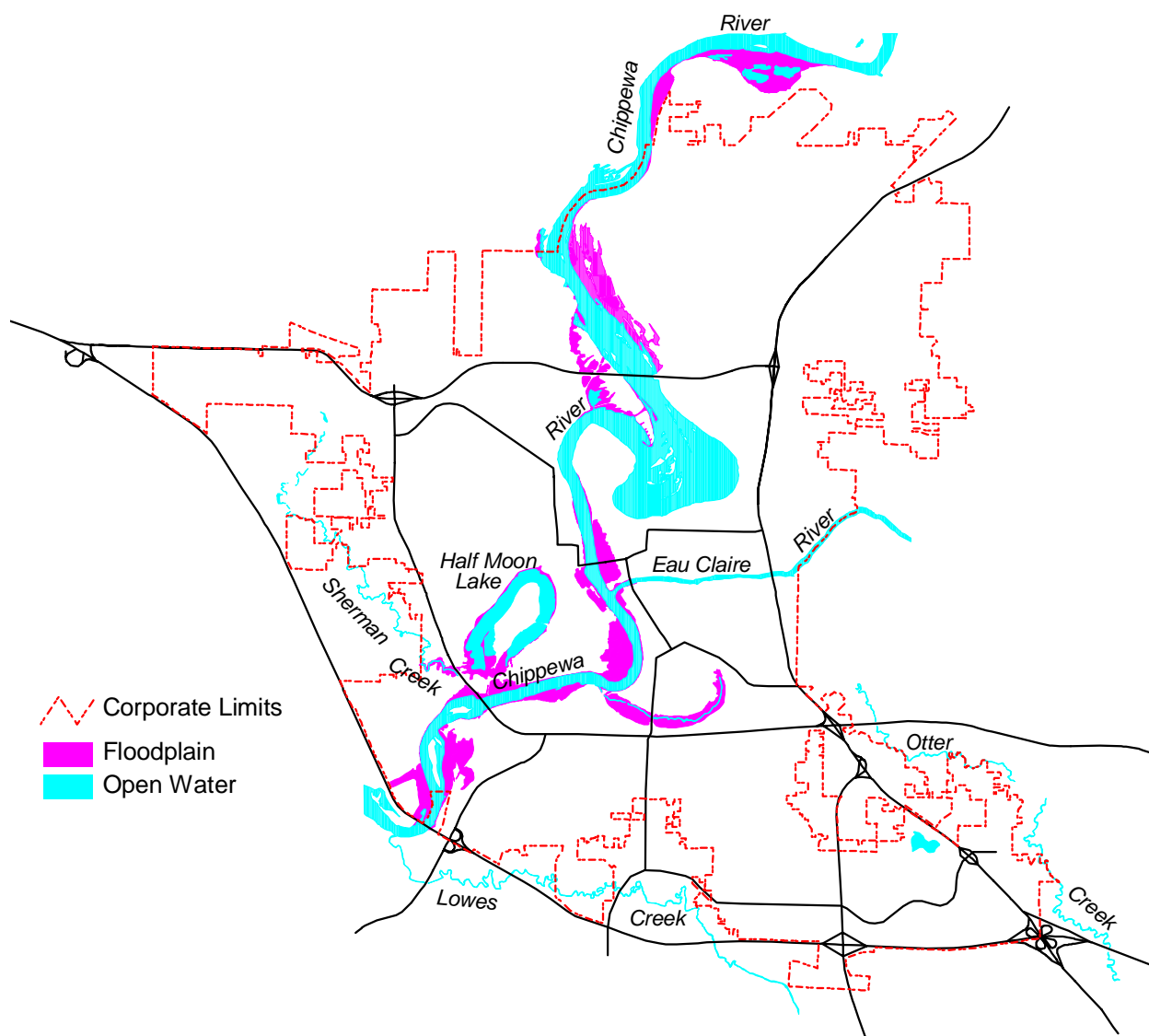
Structures in the Floodplain and Damage Potential

A primary consideration when assessing the flood risk of a community is to identify the existing structures located within the floodplain, or other known areas of flooding.

As part of the development of the flood mitigation plan, the city of Eau Claire has compiled a comprehensive list of properties having structure(s) that are, or believed to be, in the 100-year floodplain. The list of structures and properties was compiled using existing data sources. The following sources were used to compile the data for the floodprone structures listing.

- Data gathered from historical flood events.
- City of Eau Claire Official Floodplain Zoning Maps.
- Data gathered during the implementation of the 1995 and 2001 flood buyout programs.
- Flood Insurance Rate Maps.
- City of Eau Claire Assessors Records.
- Geographic Information System (GIS) analysis using Eau Claire's citywide parcel map, floodplain map, property assessment database, and digital orthophotos.

**FIGURE 8. Floodplains
City of Eau Claire**



To compile the list of potential floodprone structures and estimate the potential damage from a regional flood to these structures, the following steps were used.

1. Using the GIS, the citywide parcel and floodplain layers were overlaid to identify all parcels that were wholly or partially within the floodplain.
2. The identified parcels were then combined over the City's digital orthophotos (aerial photographs). Each parcel was then individually viewed with the floodplain and orthophoto to determine whether there were any existing structure(s), and, if necessary, whether the structure(s) were within the floodplain.
3. All parcels having any structures wholly or partially within the floodplain were identified as such in the parcel map database.
4. The parcel map database was then joined with the City's property assessment database. All parcels that were identified in the parcel map database as having floodprone structures were selected and exported along with their property class and assessed value of improvements data.
5. Each of these parcels was then located on the Official Floodplain Zoning Map in order to record the estimated 100-year floodplain elevation and estimated structure elevation.
6. In order to estimate the potential damage caused by a regional (100-year) flood, it was necessary to calculate the percent damage that would occur to both the structure and the contents in the structure in proportion to the depth of the flood within the structure. The data used for this calculation was obtained from Table 17 of the *Design Manual for Retrofitting Flood-prone Residential Structures* manual prepared by the Federal Emergency Management Agency. Using the information provided in the manual, percent damage was interpolated for every one-tenth of a foot of flood depth within the structure.
7. The estimated flood damage for structures was calculated by multiplying the estimated fair market value by the percent damage associated with the corresponding level of flooding. To estimate the flood damage to the contents of structures, it was first necessary to first estimate the value of the contents for each structure. Based on the *Design Manual for Retrofitting Flood-prone Residential Structures*, the value of the contents of the structure(s) was determined to be 30% of the estimated fair market value. Consequently, the estimated content value was calculated by multiplying the estimated fair market value by 0.30 (30%). The estimated flood damage for the contents of structures was then calculated by multiplying the estimated content value by the percent damage associated with the corresponding level of flooding.

It is important to note that the decision to include a particular structure and corresponding property was based on the best available data. In some cases it is unclear as to the certainty of a structure's exact location with regard to the 100-year floodplain or the structure's exact elevation in relationship to the Regional Flood Elevation (RFE). Failure to include a structure in the floodplain does not necessarily mean it is above the RFE, or does the inclusion of a structure indicate that it is certain to be at or below the RFE. In addition, because the property assessment database only provides an assessment value of all of the improvements of a particular parcel, it was necessary to assume that all structures were at risk from a flood event. For example, a residential parcel may have a house and detached garage. Even if the garage was the only

structure located within the floodplain, the entire improved assessment value of the parcel was used to determine the estimated fair market value and estimated flood damage.

Based on the data from Table 13, it was determined that a total of 304 parcels have structures that are located within the floodplain. This includes 247 residential structures and 57 commercial types of structures, shown in Figures 9-1 and 9-2.

The estimated fair market value of all of these structures totals over \$25.5 million. Based on the collected data, a regional flood would result in nearly \$4 million in total damages, shown in Tables 11 and 12. This includes \$2.75 million in estimated damages to structures and \$1.22 million in damages to their contents.

**TABLE 11. Estimated Value and Flood Damage to Structures and Contents
by General Land Use
City of Eau Claire**

Generalized Land Use	Number of Structures	Structures		Contents	
		Estimated Fair Market Value	Estimated Flood Damage	Estimated Value	Estimated Flood Damage
Commercial	57	9,604,000	837,012	2,881,200	343,735
Residential	247	15,963,500	1,918,667	4,789,050	879,569
TOTAL	304	\$ 25,567,500	\$ 2,755,679	\$ 7,670,250	\$ 1,223,304

Source: City of Eau Claire Property Assessment Database, October 2001

**TABLE 12. Summary of Estimated Flood Damage to Structures and Contents
by General Land Use
City of Eau Claire**

Generalized Land Use	Number of Structures	Estimated Flood Damage to STRUCTURES	Estimated Flood Damage to CONTENTS	Total Estimated Flood Damage
Commercial	57	837,012	343,735	1,180,747
Residential	247	1,918,667	879,569	2,798,236
TOTAL	304	\$ 2,755,679	\$ 1,223,304	\$ 3,978,983

**TABLE 13. Floodprone Structures
City of Eau Claire**

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Index No.	Generalized Land Use	Reg. Flood Elevation	Est. Structure Elevation	Flood Level	Est. Fair Mkt. Value	Est. Content Value	Percent Damage Structure	Percent Damage Contents	Value Damage Structure	Value Damage Contents	Total Value Damages
				(C - D)	(F x 30%)			(F x H)		(G x I)	(J + K)
1	Residential	780.4	778.4	2.0	71,000	21,300	22.0	36.7	15,620.00	7,817.10	23,437.10
2	Residential	780.4	779.4	1.0	79,000	23,700	14.3	23.0	11,297.00	5,451.00	16,748.00
3	Residential	780.4	780.1	0.3	87,000	26,100	7.1	8.2	6,177.00	2,140.20	8,317.20
4	Residential	780.4	780.2	0.2	43,000	12,900	6.0	6.1	2,580.00	786.90	3,366.90
5	Residential	780.4	780.3	0.1	38,000	11,400	5.0	4.0	1,900.00	456.00	2,356.00
6	Residential	780.4	780.2	0.2	80,000	24,000	6.0	6.1	4,800.00	1,464.00	6,264.00
7	Residential	780.4	781.0	0.0	68,000	20,400	0.0	0.0	0.00	0.00	0.00
8	Commercial	780.4	779.9	0.5	230,000	69,000	9.1	12.4	20,930.00	8,556.00	29,486.00
9	Commercial	782.2	782.0	0.2	102,000	30,600	6.0	6.1	6,120.00	1,866.60	7,986.60
10	Residential	782.2	782.0	0.2	35,000	10,500	6.0	6.1	2,100.00	640.50	2,740.50
11	Residential	782.2	782.5	0.0	58,000	17,400	0.0	0.0	0.00	0.00	0.00
12	Residential	782.2	782.8	0.0	45,000	13,500	0.0	0.0	0.00	0.00	0.00
13	Residential	782.2	784.6	0.0	86,000	25,800	0.0	0.0	0.00	0.00	0.00
14	Residential	782.2	784.5	0.0	67,000	20,100	0.0	0.0	0.00	0.00	0.00
15	Residential	782.2	784.5	0.0	55,000	16,500	0.0	0.0	0.00	0.00	0.00
16	Residential	782.2	784.5	0.0	59,000	17,700	0.0	0.0	0.00	0.00	0.00
17	Residential	782.2	784.5	0.0	90,000	27,000	0.0	0.0	0.00	0.00	0.00
18	Residential	782.2	784.5	0.0	47,000	14,100	0.0	0.0	0.00	0.00	0.00
19	Residential	782.2	784.5	0.0	59,000	17,700	0.0	0.0	0.00	0.00	0.00
20	Residential	782.2	784.5	0.0	71,000	21,300	0.0	0.0	0.00	0.00	0.00
21	Residential	782.2	783.2	0.0	34,000	10,200	0.0	0.0	0.00	0.00	0.00
22	Residential	782.2	786.5	0.0	43,000	12,900	0.0	0.0	0.00	0.00	0.00
23	Residential	782.2	784.0	0.0	75,000	22,500	0.0	0.0	0.00	0.00	0.00
24	Residential	782.2	782.5	0.0	56,000	16,800	0.0	0.0	0.00	0.00	0.00
25	Residential	782.2	785.0	0.0	59,000	17,700	0.0	0.0	0.00	0.00	0.00
26	Commercial	782.2	782.5	0.0	0	0	0.0	0.0	0.00	0.00	0.00
27	Residential	782.2	783.6	0.0	38,000	11,400	0.0	0.0	0.00	0.00	0.00
28	Residential	782.2	783.6	0.0	36,000	10,800	0.0	0.0	0.00	0.00	0.00
29	Residential	782.2	782.5	0.0	49,000	14,700	0.0	0.0	0.00	0.00	0.00
30	Residential	778.0	780.0	0.0	69,000	20,700	0.0	0.0	0.00	0.00	0.00
31	Residential	780.4	780.0	0.4	127,000	38,100	8.1	10.3	10,287.00	3,924.30	14,211.30
32	Residential	780.4	780.2	0.2	57,000	17,100	6.0	6.1	3,420.00	1,043.10	4,463.10
33	Residential	780.4	782.0	0.0	53,000	15,900	0.0	0.0	0.00	0.00	0.00
34	Residential	780.4	780.0	0.4	65,000	19,500	8.1	10.3	5,265.00	2,008.50	7,273.50
35	Residential	780.4	780.0	0.4	93,000	27,900	8.1	10.3	7,533.00	2,873.70	10,406.70
36	Residential	780.4	780.0	0.4	97,000	29,100	8.1	10.3	7,857.00	2,997.30	10,854.30
37	Residential	780.4	780.0	0.4	81,000	24,300	8.1	10.3	6,561.00	2,502.90	9,063.90
38	Residential	780.6	780.4	0.2	75,000	22,500	6.0	6.1	4,500.00	1,372.50	5,872.50
39	Residential	780.6	780.4	0.2	71,000	21,300	6.0	6.1	4,260.00	1,299.30	5,559.30
40	Residential	780.6	780.4	0.2	102,000	30,600	6.0	6.1	6,120.00	1,866.60	7,986.60
41	Residential	780.6	780.4	0.2	70,000	21,000	6.0	6.1	4,200.00	1,281.00	5,481.00
42	Residential	780.6	780.4	0.2	84,000	25,200	6.0	6.1	5,040.00	1,537.20	6,577.20
43	Residential	780.6	780.2	0.4	86,000	25,800	8.1	10.3	6,966.00	2,657.40	9,623.40
44	Residential	780.6	780.4	0.2	91,000	27,300	6.0	6.1	5,460.00	1,665.30	7,125.30
45	Residential	780.6	780.4	0.2	88,000	26,400	6.0	6.1	5,280.00	1,610.40	6,890.40
46	Residential	780.6	780.4	0.2	109,000	32,700	6.0	6.1	6,540.00	1,994.70	8,534.70
47	Residential	780.8	780.4	0.4	113,000	33,900	8.1	10.3	9,153.00	3,491.70	12,644.70
48	Residential	780.8	780.4	0.4	97,000	29,100	8.1	10.3	7,857.00	2,997.30	10,854.30
49	Residential	780.8	780.4	0.4	93,000	27,900	8.1	10.3	7,533.00	2,873.70	10,406.70
50	Residential	781.2	780.5	0.7	75,000	22,500	11.2	16.7	8,400.00	3,757.50	12,157.50
51	Residential	781.5	781.0	0.5	57,000	17,100	9.1	12.4	5,187.00	2,120.40	7,307.40
52	Residential	781.5	781.0	0.5	46,000	13,800	9.1	12.4	4,186.00	1,711.20	5,897.20
53	Residential	781.5	781.0	0.5	87,000	26,100	9.1	12.4	7,917.00	3,236.40	11,153.40
54	Residential	781.5	781.0	0.5	40,000	12,000	9.1	12.4	3,640.00	1,488.00	5,128.00

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Index	Generalized	Reg.	Est.	Flood	Est.	Est.	Percent	Percent	Value	Value	Total
No.	Land Use	Flood	Structure	Level	Fair Mkt.	Content	Damage	Damage	Damage	Damage	Value
		Elevation	Elevation		Value	Value	Structure	Contents	Structure	Contents	Damages
				(C - D)		(F x 30%)			(F x H)	(G x I)	(J + K)
55	Residential	781.5	781.0	0.5	105,000	31,500	9.1	12.4	9,555.00	3,906.00	13,461.00
56	Residential	781.5	781.0	0.5	65,000	19,500	9.1	12.4	5,915.00	2,418.00	8,333.00
57	Residential	781.5	781.0	0.5	62,000	18,600	9.1	12.4	5,642.00	2,306.40	7,948.40
58	Residential	781.5	781.0	0.5	99,000	29,700	9.1	12.4	9,009.00	3,682.80	12,691.80
59	Residential	781.5	781.0	0.5	63,000	18,900	9.1	12.4	5,733.00	2,343.60	8,076.60
60	Residential	781.8	781.0	0.8	57,000	17,100	12.3	18.8	7,011.00	3,214.80	10,225.80
61	Residential	781.8	781.0	0.8	50,000	15,000	12.3	18.8	6,150.00	2,820.00	8,970.00
62	Residential	781.8	781.0	0.8	54,000	16,200	12.3	18.8	6,642.00	3,045.60	9,687.60
63	Residential	781.8	781.5	0.3	66,000	19,800	7.1	8.2	4,686.00	1,623.60	6,309.60
64	Residential	781.8	781.5	0.3	84,000	25,200	7.1	8.2	5,964.00	2,066.40	8,030.40
65	Residential	781.8	781.5	0.3	38,000	11,400	7.1	8.2	2,698.00	934.80	3,632.80
66	Residential	781.8	781.5	0.3	89,000	26,700	7.1	8.2	6,319.00	2,189.40	8,508.40
67	Residential	781.8	781.5	0.3	84,000	25,200	7.1	8.2	5,964.00	2,066.40	8,030.40
68	Residential	781.8	780.8	1.0	68,000	20,400	14.3	23.0	9,724.00	4,692.00	14,416.00
69	Residential	781.8	781.2	0.6	39,000	11,700	10.2	14.6	3,978.00	1,708.20	5,686.20
70	Residential	781.8	781.2	0.6	46,000	13,800	10.2	14.6	4,692.00	2,014.80	6,706.80
71	Residential	781.8	781.2	0.6	45,000	13,500	10.2	14.6	4,590.00	1,971.00	6,561.00
72	Residential	781.8	781.7	0.1	61,000	18,300	5.0	4.0	3,050.00	732.00	3,782.00
73	Commercial	781.8	781.7	0.1	32,000	9,600	5.0	4.0	1,600.00	384.00	1,984.00
74	Residential	781.8	781.7	0.1	55,000	16,500	5.0	4.0	2,750.00	660.00	3,410.00
75	Residential	781.8	781.7	0.1	45,000	13,500	5.0	4.0	2,250.00	540.00	2,790.00
76	Residential	781.8	781.7	0.1	44,000	13,200	5.0	4.0	2,200.00	528.00	2,728.00
77	Residential	782.2	782.1	0.1	33,000	9,900	5.0	4.0	1,650.00	396.00	2,046.00
78	Residential	782.2	782.0	0.2	35,000	10,500	6.0	6.1	2,100.00	640.50	2,740.50
79	Residential	782.2	781.5	0.7	71,000	21,300	11.2	16.7	7,952.00	3,557.10	11,509.10
80	Residential	782.2	780.3	1.9	0	0	21.2	35.3	0.00	0.00	0.00
81	Commercial	780.8	780.6	0.2	221,000	66,300	6.0	6.1	13,260.00	4,044.30	17,304.30
82	Residential	780.8	780.4	0.4	0	0	8.1	10.3	0.00	0.00	0.00
83	Residential	772.0	771.0	1.0	37,000	11,100	14.3	23.0	5,291.00	2,553.00	7,844.00
84	Residential	782.2	781.2	1.0	52,000	15,600	14.3	23.0	7,436.00	3,588.00	11,024.00
85	Residential	782.2	781.0	1.2	43,000	12,900	15.9	25.7	6,837.00	3,315.30	10,152.30
86	Commercial	780.6	780.5	0.1	252,000	75,600	5.0	4.0	12,600.00	3,024.00	15,624.00
87	Commercial	776.0	775.0	1.0	0	0	14.3	23.0	0.00	0.00	0.00
88	Residential	781.8	781.6	0.2	70,000	21,000	6.0	6.1	4,200.00	1,281.00	5,481.00
89	Residential	781.8	781.0	0.8	60,000	18,000	12.3	18.8	7,380.00	3,384.00	10,764.00
90	Residential	803.2	801.7	1.5	100,500	30,150	18.2	29.8	18,291.00	8,984.70	27,275.70
91	Residential	803.2	803.0	0.2	98,000	29,400	6.0	6.1	5,880.00	1,793.40	7,673.40
92	Residential	803.2	803.0	0.2	108,500	32,550	6.0	6.1	6,510.00	1,985.55	8,495.55
93	Residential	803.2	803.0	0.2	132,000	39,600	6.0	6.1	7,920.00	2,415.60	10,335.60
94	Residential	803.2	803.1	0.1	29,500	8,850	5.0	4.0	1,475.00	354.00	1,829.00
95	Residential	803.2	803.1	0.1	38,500	11,550	5.0	4.0	1,925.00	462.00	2,387.00
96	Residential	780.2	777.8	2.4	125,000	37,500	23.9	40.4	29,875.00	15,150.00	45,025.00
97	Residential	780.2	778.2	2.0	63,000	18,900	22.0	36.7	13,860.00	6,936.30	20,796.30
98	Residential	780.2	778.4	1.8	63,000	18,900	20.5	33.9	12,915.00	6,407.10	19,322.10
99	Residential	780.2	778.6	1.6	105,000	31,500	18.9	31.2	19,845.00	9,828.00	29,673.00
100	Residential	780.2	778.8	1.4	75,000	22,500	17.4	28.5	13,050.00	6,412.50	19,462.50
101	Residential	780.2	778.8	1.4	65,000	19,500	17.4	28.5	11,310.00	5,557.50	16,867.50
102	Residential	780.2	778.8	1.4	90,000	27,000	17.4	28.5	15,660.00	7,695.00	23,355.00
103	Residential	780.5	779.9	0.6	86,000	25,800	10.2	14.6	8,772.00	3,766.80	12,538.80
104	Residential	780.5	779.9	0.6	73,000	21,900	10.2	14.6	7,446.00	3,197.40	10,643.40
105	Residential	780.5	779.9	0.6	66,000	19,800	10.2	14.6	6,732.00	2,890.80	9,622.80
106	Residential	780.5	779.9	0.6	61,000	18,300	10.2	14.6	6,222.00	2,671.80	8,893.80
107	Residential	780.5	779.9	0.6	45,000	13,500	10.2	14.6	4,590.00	1,971.00	6,561.00
108	Residential	803.2	801.0	2.2	72,000	21,600	22.9	38.5	16,488.00	8,316.00	24,804.00
109	Residential	803.2	799.0	4.2	175,000	52,500	31.1	53.6	54,425.00	28,140.00	82,565.00
110	Residential	803.2	800.0	3.2	102,000	30,600	27.5	47.3	28,050.00	14,473.80	42,523.80
111	Residential	778.0	777.5	0.5	194,000	58,200	9.1	12.4	17,654.00	7,216.80	24,870.80

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Index	Generalized	Reg.	Est.	Flood	Est.	Est.	Percent	Percent	Value	Value	Total
No.	Land Use	Flood	Structure	Level	Fair Mkt.	Content	Damage	Damage	Damage	Damage	Value
		Elevation	Elevation		Value	Value	Structure	Contents	Structure	Contents	Damages
				(C - D)		(F x 30%)			(F x H)	(G x I)	(J + K)
112	Commercial	781.5	781.0	0.5	137,000	41,100	9.1	12.4	12,467.00	5,096.40	17,563.40
113	Commercial	781.5	781.0	0.5	64,000	19,200	9.1	12.4	5,824.00	2,380.80	8,204.80
114	Commercial	783.5	780.5	3.0	59,000	17,700	26.7	46.0	15,753.00	8,142.00	23,895.00
115	Commercial	783.5	779.0	4.5	0	0	31.8	55.0	0.00	0.00	0.00
116	Residential	783.5	779.5	4.0	0	0	30.7	52.7	0.00	0.00	0.00
117	Residential	783.5	781.0	2.5	128,500	38,550	24.3	41.3	31,225.50	15,921.15	47,146.65
118	Commercial	783.5	780.5	3.0	0	0	26.7	46.0	0.00	0.00	0.00
119	Commercial	783.5	781.5	2.0	28,000	8,400	22.0	36.7	6,160.00	3,082.80	9,242.80
120	Commercial	783.5	781.7	1.8	13,000	3,900	20.5	33.9	2,665.00	1,322.10	3,987.10
121	Commercial	783.5	782.4	1.1	67,000	20,100	15.1	24.4	10,117.00	4,904.40	15,021.40
122	Commercial	783.5	782.4	1.1	64,000	19,200	15.1	24.4	9,664.00	4,684.80	14,348.80
123	Commercial	783.5	783.0	0.5	119,000	35,700	9.1	12.4	10,829.00	4,426.80	15,255.80
124	Commercial	783.5	783.4	0.1	66,000	19,800	5.0	4.0	3,300.00	792.00	4,092.00
125	Commercial	783.5	783.4	0.1	83,000	24,900	5.0	4.0	4,150.00	996.00	5,146.00
126	Residential	804.0	804.0	0.0	85,000	25,500	0.0	0.0	0.00	0.00	0.00
127	Commercial	781.5	780.0	1.5	465,000	139,500	18.2	29.8	84,630.00	41,571.00	126,201.00
128	Commercial	781.5	782.0	0.0	78,000	23,400	0.0	0.0	0.00	0.00	0.00
129	Residential	781.2	781.0	0.2	38,000	11,400	6.0	6.1	2,280.00	695.40	2,975.40
130	Residential	781.2	781.0	0.2	99,000	29,700	6.0	6.1	5,940.00	1,811.70	7,751.70
131	Residential	781.2	780.8	0.4	99,000	29,700	8.1	10.3	8,019.00	3,059.10	11,078.10
132	Residential	783.0	783.0	0.0	38,000	11,400	0.0	0.0	0.00	0.00	0.00
133	Residential	783.0	782.8	0.2	37,000	11,100	6.0	6.1	2,220.00	677.10	2,897.10
134	Residential	783.0	783.0	0.0	23,500	7,050	0.0	0.0	0.00	0.00	0.00
135	Residential	803.2	803.1	0.1	53,000	15,900	5.0	4.0	2,650.00	636.00	3,286.00
136	Residential	783.5	778.0	5.5	0	0	34.2	58.7	0.00	0.00	0.00
137	Residential	783.5	779.0	4.5	31,500	9,450	31.8	55.0	10,017.00	5,197.50	15,214.50
138	Residential	783.5	779.0	4.5	18,000	5,400	31.8	55.0	5,724.00	2,970.00	8,694.00
139	Residential	783.5	779.5	4.0	44,500	13,350	30.7	52.7	13,661.50	7,035.45	20,696.95
140	Residential	783.5	779.5	4.0	0	0	30.7	52.7	0.00	0.00	0.00
141	Residential	783.5	779.7	3.8	15,000	4,500	29.9	51.3	4,485.00	2,308.50	6,793.50
142	Residential	783.5	779.9	3.6	24,000	7,200	29.1	50.0	6,984.00	3,600.00	10,584.00
143	Residential	783.5	779.9	3.6	35,500	10,650	29.1	50.0	10,330.50	5,325.00	15,655.50
144	Residential	783.5	780.5	3.0	0	0	26.7	46.0	0.00	0.00	0.00
145	Residential	783.5	780.9	2.6	55,000	16,500	24.8	42.3	13,640.00	6,979.50	20,619.50
146	Residential	783.5	781.0	2.5	41,500	12,450	24.3	41.3	10,084.50	5,141.85	15,226.35
147	Residential	783.5	781.0	2.5	35,000	10,500	24.3	41.3	8,505.00	4,336.50	12,841.50
148	Residential	783.5	781.0	2.5	52,500	15,750	24.3	41.3	12,757.50	6,504.75	19,262.25
149	Residential	783.5	781.0	2.5	38,500	11,550	24.3	41.3	9,355.50	4,770.15	14,125.65
150	Residential	783.5	781.0	2.5	36,500	10,950	24.3	41.3	8,869.50	4,522.35	13,391.85
151	Residential	783.5	781.0	2.5	45,000	13,500	24.3	41.3	10,935.00	5,575.50	16,510.50
152	Residential	783.5	781.0	2.5	45,000	13,500	24.3	41.3	10,935.00	5,575.50	16,510.50
153	Residential	783.5	783.2	0.3	0	0	7.1	8.2	0.00	0.00	0.00
154	Residential	783.5	781.0	2.5	42,000	12,600	24.3	41.3	10,206.00	5,203.80	15,409.80
155	Residential	783.5	781.0	2.5	28,000	8,400	24.3	41.3	6,804.00	3,469.20	10,273.20
156	Residential	783.5	781.0	2.5	32,500	9,750	24.3	41.3	7,897.50	4,026.75	11,924.25
157	Residential	783.5	781.0	2.5	26,000	7,800	24.3	41.3	6,318.00	3,221.40	9,539.40
158	Residential	783.5	781.0	2.5	33,000	9,900	24.3	41.3	8,019.00	4,088.70	12,107.70
159	Residential	783.5	781.0	2.5	36,500	10,950	24.3	41.3	8,869.50	4,522.35	13,391.85
160	Residential	783.5	781.0	2.5	23,000	6,900	24.3	41.3	5,589.00	2,849.70	8,438.70
161	Residential	783.5	781.5	2.0	36,000	10,800	22.0	36.7	7,920.00	3,963.60	11,883.60
162	Residential	783.5	780.5	3.0	0	0	26.7	46.0	0.00	0.00	0.00
163	Residential	783.5	783.3	0.2	25,500	7,650	6.0	6.1	1,530.00	466.65	1,996.65
164	Residential	783.5	783.3	0.2	27,000	8,100	6.0	6.1	1,620.00	494.10	2,114.10
165	Residential	783.5	783.4	0.1	39,500	11,850	5.0	4.0	1,975.00	474.00	2,449.00
166	Residential	783.5	782.0	1.5	0	0	18.2	29.8	0.00	0.00	0.00
167	Residential	781.8	781.6	0.2	47,000	14,100	6.0	6.1	2,820.00	860.10	3,680.10
168	Residential	781.8	781.6	0.2	33,000	9,900	6.0	6.1	1,980.00	603.90	2,583.90

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Index	Generalized	Reg.	Est.	Flood	Est.	Est.	Percent	Percent	Value	Value	Total
No.	Land Use	Flood	Structure	Level	Fair Mkt.	Content	Damage	Damage	Damage	Damage	Value
		Elevation	Elevation		Value	Value	Structure	Contents	Structure	Contents	Damages
				(C - D)		(F x 30%)			(F x H)	(G x I)	(J + K)
169	Residential	781.8	781.4	0.4	88,000	26,400	8.1	10.3	7,128.00	2,719.20	9,847.20
170	Residential	781.8	781.7	0.1	71,000	21,300	5.0	4.0	3,550.00	852.00	4,402.00
171	Commercial	783.5	780.0	3.5	0	0	28.7	49.3	0.00	0.00	0.00
172	Residential	783.5	780.0	3.5	0	0	28.7	49.3	0.00	0.00	0.00
173	Residential	783.5	779.9	3.6	0	0	29.1	50.0	0.00	0.00	0.00
174	Commercial	783.5	781.0	2.5	0	0	24.3	41.3	0.00	0.00	0.00
175	Commercial	781.5	781.0	0.5	42,500	12,750	9.1	12.4	3,867.50	1,581.00	5,448.50
176	Commercial	781.5	781.0	0.5	160,000	48,000	9.1	12.4	14,560.00	5,952.00	20,512.00
177	Commercial	781.5	781.0	0.5	89,000	26,700	9.1	12.4	8,099.00	3,310.80	11,409.80
178	Commercial	781.5	781.0	0.5	618,000	185,400	9.1	12.4	56,238.00	22,989.60	79,227.60
179	Commercial	781.5	782.8	0.0	85,000	25,500	0.0	0.0	0.00	0.00	0.00
180	Commercial	781.5	781.0	0.5	316,000	94,800	9.1	12.4	28,756.00	11,755.20	40,511.20
181	Commercial	781.5	781.0	0.5	379,000	113,700	9.1	12.4	34,489.00	14,098.80	48,587.80
182	Commercial	781.5	781.0	0.5	2,540,000	762,000	9.1	12.4	231,140.00	94,488.00	325,628.00
183	Residential	803.2	803.0	0.2	112,000	33,600	6.0	6.1	6,720.00	2,049.60	8,769.60
184	Residential	803.2	802.2	1.0	137,000	41,100	14.3	23.0	19,591.00	9,453.00	29,044.00
185	Residential	803.2	802.2	1.0	73,500	22,050	14.3	23.0	10,510.50	5,071.50	15,582.00
186	Residential	803.2	802.0	1.2	73,500	22,050	15.9	25.7	11,686.50	5,666.85	17,353.35
187	Residential	803.2	802.3	0.9	83,500	25,050	13.3	20.9	11,105.50	5,235.45	16,340.95
188	Residential	803.2	803.0	0.2	89,000	26,700	6.0	6.1	5,340.00	1,628.70	6,968.70
189	Residential	803.2	803.0	0.2	68,000	20,400	6.0	6.1	4,080.00	1,244.40	5,324.40
190	Residential	803.2	803.0	0.2	70,500	21,150	6.0	6.1	4,230.00	1,290.15	5,520.15
191	Residential	803.2	803.1	0.1	72,500	21,750	5.0	4.0	3,625.00	870.00	4,495.00
192	Residential	783.5	779.5	4.0	0	0	30.7	52.7	0.00	0.00	0.00
193	Commercial	783.5	781.0	2.5	12,000	3,600	24.3	41.3	2,916.00	1,486.80	4,402.80
194	Residential	783.5	780.3	3.2	0	0	27.5	47.3	0.00	0.00	0.00
195	Residential	783.5	782.2	1.3	0	0	16.6	27.1	0.00	0.00	0.00
196	Residential	783.5	783.0	0.5	31,500	9,450	9.1	12.4	2,866.50	1,171.80	4,038.30
197	Residential	783.5	783.0	0.5	29,500	8,850	9.1	12.4	2,684.50	1,097.40	3,781.90
198	Residential	783.5	782.0	1.5	21,000	6,300	18.2	29.8	3,822.00	1,877.40	5,699.40
199	Residential	783.5	783.0	0.5	42,000	12,600	9.1	12.4	3,822.00	1,562.40	5,384.40
200	Residential	783.5	782.0	1.5	28,500	8,550	18.2	29.8	5,187.00	2,547.90	7,734.90
201	Residential	783.5	783.0	0.5	28,000	8,400	9.1	12.4	2,548.00	1,041.60	3,589.60
202	Residential	783.5	782.1	1.4	84,500	25,350	17.4	28.5	14,703.00	7,224.75	21,927.75
203	Residential	783.5	782.1	1.4	36,500	10,950	17.4	28.5	6,351.00	3,120.75	9,471.75
204	Residential	783.5	782.5	1.0	63,000	18,900	14.3	23.0	9,009.00	4,347.00	13,356.00
205	Residential	783.5	782.5	1.0	46,500	13,950	14.3	23.0	6,649.50	3,208.50	9,858.00
206	Residential	783.5	782.6	0.9	43,000	12,900	13.3	20.9	5,719.00	2,696.10	8,415.10
207	Residential	783.5	782.6	0.9	42,000	12,600	13.3	20.9	5,586.00	2,633.40	8,219.40
208	Residential	783.5	782.7	0.8	43,000	12,900	12.3	18.8	5,289.00	2,425.20	7,714.20
209	Residential	783.5	783.0	0.5	50,000	15,000	9.1	12.4	4,550.00	1,860.00	6,410.00
210	Residential	783.5	784.0	0.0	49,500	14,850	0.0	0.0	0.00	0.00	0.00
211	Residential	780.4	780.3	0.1	57,000	17,100	5.0	4.0	2,850.00	684.00	3,534.00
212	Residential	780.4	780.3	0.1	75,000	22,500	5.0	4.0	3,750.00	900.00	4,650.00
213	Residential	780.4	779.9	0.5	60,000	18,000	9.1	12.4	5,460.00	2,232.00	7,692.00
214	Residential	780.4	780.3	0.1	77,000	23,100	5.0	4.0	3,850.00	924.00	4,774.00
215	Residential	774.0	776.0	0.0	70,000	21,000	0.0	0.0	0.00	0.00	0.00
216	Residential	774.0	776.0	0.0	82,000	24,600	0.0	0.0	0.00	0.00	0.00
217	Residential	803.2	803.0	0.2	89,000	26,700	6.0	6.1	5,340.00	1,628.70	6,968.70
218	Residential	803.2	803.0	0.2	93,500	28,050	6.0	6.1	5,610.00	1,711.05	7,321.05
219	Residential	803.2	799.8	3.4	87,000	26,100	28.3	48.7	24,621.00	12,710.70	37,331.70
220	Residential	780.8	780.7	0.1	65,000	19,500	5.0	4.0	3,250.00	780.00	4,030.00
221	Residential	780.8	780.4	0.4	72,000	21,600	8.1	10.3	5,832.00	2,224.80	8,056.80
222	Residential	780.8	780.4	0.4	68,000	20,400	8.1	10.3	5,508.00	2,101.20	7,609.20
223	Residential	780.8	780.4	0.4	67,000	20,100	8.1	10.3	5,427.00	2,070.30	7,497.30
224	Residential	780.8	780.4	0.4	76,000	22,800	8.1	10.3	6,156.00	2,348.40	8,504.40
225	Residential	780.8	780.4	0.4	87,000	26,100	8.1	10.3	7,047.00	2,688.30	9,735.30

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Index	Generalized	Reg.	Est.	Flood	Est.	Est.	Percent	Percent	Value	Value	Total
No.	Land Use	Flood	Structure	Level	Fair Mkt.	Content	Damage	Damage	Damage	Damage	Value
		Elevation	Elevation		Value	Value	Structure	Contents	Structure	Contents	Damages
				(C - D)		(F x 30%)			(F x H)	(G x I)	(J + K)
226	Residential	780.8	780.6	0.2	94,000	28,200	6.0	6.1	5,640.00	1,720.20	7,360.20
227	Commercial	778.0	780.0	0.0	335,000	100,500	0.0	0.0	0.00	0.00	0.00
228	Commercial	778.0	780.0	0.0	118,000	35,400	0.0	0.0	0.00	0.00	0.00
229	Commercial	778.0	779.0	0.0	16,000	4,800	0.0	0.0	0.00	0.00	0.00
230	Commercial	783.5	782.5	1.0	245,000	73,500	14.3	23.0	35,035.00	16,905.00	51,940.00
231	Commercial	783.5	782.5	1.0	102,000	30,600	14.3	23.0	14,586.00	7,038.00	21,624.00
232	Commercial	783.5	783.0	0.5	28,000	8,400	9.1	12.4	2,548.00	1,041.60	3,589.60
233	Commercial	783.5	783.0	0.5	16,500	4,950	9.1	12.4	1,501.50	613.80	2,115.30
234	Commercial	783.5	783.0	0.5	51,000	15,300	9.1	12.4	4,641.00	1,897.20	6,538.20
235	Commercial	783.5	783.0	0.5	29,000	8,700	9.1	12.4	2,639.00	1,078.80	3,717.80
236	Commercial	783.5	783.0	0.5	58,000	17,400	9.1	12.4	5,278.00	2,157.60	7,435.60
237	Commercial	783.5	783.4	0.1	25,000	7,500	5.0	4.0	1,250.00	300.00	1,550.00
238	Residential	772.0	771.9	0.1	46,000	13,800	5.0	4.0	2,300.00	552.00	2,852.00
239	Residential	772.0	771.0	1.0	48,000	14,400	14.3	23.0	6,864.00	3,312.00	10,176.00
240	Residential	772.0	771.0	1.0	41,000	12,300	14.3	23.0	5,863.00	2,829.00	8,692.00
241	Residential	780.5	779.0	1.5	46,000	13,800	18.2	29.8	8,372.00	4,112.40	12,484.40
242	Residential	780.5	779.0	1.5	0	0	18.2	29.8	0.00	0.00	0.00
243	Commercial	780.5	780.0	0.5	206,000	61,800	9.1	12.4	18,746.00	7,663.20	26,409.20
244	Residential	780.5	780.0	0.5	101,000	30,300	9.1	12.4	9,191.00	3,757.20	12,948.20
245	Residential	780.5	780.0	0.5	53,000	15,900	9.1	12.4	4,823.00	1,971.60	6,794.60
246	Residential	780.5	780.4	0.1	69,000	20,700	5.0	4.0	3,450.00	828.00	4,278.00
247	Residential	780.5	780.4	0.1	63,000	18,900	5.0	4.0	3,150.00	756.00	3,906.00
248	Residential	780.5	780.0	0.5	69,000	20,700	9.1	12.4	6,279.00	2,566.80	8,845.80
249	Residential	780.5	780.4	0.1	84,000	25,200	5.0	4.0	4,200.00	1,008.00	5,208.00
250	Residential	780.5	780.4	0.1	85,000	25,500	5.0	4.0	4,250.00	1,020.00	5,270.00
251	Residential	783.5	782.0	1.5	33,500	10,050	18.2	29.8	6,097.00	2,994.90	9,091.90
252	Residential	782.4	782.3	0.1	58,000	17,400	5.0	4.0	2,900.00	696.00	3,596.00
253	Residential	782.4	782.2	0.2	58,000	17,400	6.0	6.1	3,480.00	1,061.40	4,541.40
254	Residential	782.4	782.0	0.4	32,000	9,600	8.1	10.3	2,592.00	988.80	3,580.80
255	Commercial	780.5	780.5	0.0	0	0	0.0	0.0	0.00	0.00	0.00
256	Residential	782.4	782.0	0.4	49,000	14,700	8.1	10.3	3,969.00	1,514.10	5,483.10
257	Residential	782.4	782.2	0.2	67,000	20,100	6.0	6.1	4,020.00	1,226.10	5,246.10
258	Residential	782.4	782.3	0.1	45,000	13,500	5.0	4.0	2,250.00	540.00	2,790.00
259	Residential	801.5	799.0	2.5	90,000	27,000	24.3	41.3	21,870.00	11,151.00	33,021.00
260	Residential	801.5	799.0	2.5	106,000	31,800	24.3	41.3	25,758.00	13,133.40	38,891.40
261	Residential	801.5	799.5	2.0	251,500	75,450	22.0	36.7	55,330.00	27,690.15	83,020.15
262	Residential	801.5	801.0	0.5	191,500	57,450	9.1	12.4	17,426.50	7,123.80	24,550.30
263	Residential	802.0	800.5	1.5	260,500	78,150	18.2	29.8	47,411.00	23,288.70	70,699.70
264	Residential	802.0	800.5	1.5	163,500	49,050	18.2	29.8	29,757.00	14,616.90	44,373.90
265	Residential	802.0	801.5	0.5	138,500	41,550	9.1	12.4	12,603.50	5,152.20	17,755.70
266	Residential	802.0	798.0	4.0	161,000	48,300	30.7	52.7	49,427.00	25,454.10	74,881.10
267	Residential	802.0	800.0	2.0	194,000	58,200	22.0	36.7	42,680.00	21,359.40	64,039.40
268	Residential	803.0	799.0	4.0	134,000	40,200	30.7	52.7	41,138.00	21,185.40	62,323.40
269	Residential	803.0	802.0	1.0	79,500	23,850	14.3	23.0	11,368.50	5,485.50	16,854.00
270	Residential	803.0	802.0	1.0	97,500	29,250	14.3	23.0	13,942.50	6,727.50	20,670.00
271	Residential	803.0	803.0	0.0	99,000	29,700	0.0	0.0	0.00	0.00	0.00
272	Residential	803.2	803.0	0.2	113,500	34,050	6.0	6.1	6,810.00	2,077.05	8,887.05
273	Residential	803.2	804.0	0.0	48,000	14,400	0.0	0.0	0.00	0.00	0.00
274	Residential	803.2	800.5	2.7	41,000	12,300	25.3	43.2	10,373.00	5,313.60	15,686.60
275	Residential	803.2	800.0	3.2	51,000	15,300	27.5	47.3	14,025.00	7,236.90	21,261.90
276	Residential	803.2	799.0	4.2	95,000	28,500	31.1	53.6	29,545.00	15,276.00	44,821.00
277	Residential	803.2	799.0	4.2	78,000	23,400	31.1	53.6	24,258.00	12,542.40	36,800.40
278	Residential	803.2	798.0	5.2	100,000	30,000	33.5	57.9	33,500.00	17,370.00	50,870.00
279	Residential	803.2	799.0	4.2	80,500	24,150	31.1	53.6	25,035.50	12,944.40	37,979.90
280	Residential	803.2	799.0	4.2	69,000	20,700	31.1	53.6	21,459.00	11,095.20	32,554.20
281	Residential	803.2	799.5	3.7	94,500	28,350	29.5	50.7	27,877.50	14,373.45	42,250.95
282	Residential	803.2	800.0	3.2	94,000	28,200	27.5	47.3	25,850.00	13,338.60	39,188.60

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
Index	Generalized	Reg.	Est.	Flood	Est.	Est.	Percent	Percent	Value	Value	Total
No.	Land Use	Flood	Structure	Level	Fair Mkt.	Content	Damage	Damage	Damage	Damage	Value
		Elevation	Elevation		Value	Value	Structure	Contents	Structure	Contents	Damages
				(C - D)		(F x 30%)			(F x H)	(G x I)	(J + K)
283	Residential	803.2	799.0	4.2	59,000	17,700	31.1	53.6	18,349.00	9,487.20	27,836.20
284	Residential	803.2	801.0	2.2	42,000	12,600	22.9	38.5	9,618.00	4,851.00	14,469.00
285	Residential	803.6	803.6	0.0	90,500	27,150	0.0	0.0	0.00	0.00	0.00
286	Commercial	781.5	781.0	0.5	51,000	15,300	9.1	12.4	4,641.00	1,897.20	6,538.20
287	Commercial	781.5	781.0	0.5	120,000	36,000	9.1	12.4	10,920.00	4,464.00	15,384.00
288	Commercial	781.5	781.0	0.5	75,000	22,500	9.1	12.4	6,825.00	2,790.00	9,615.00
289	Commercial	774.8	774.0	0.8	245,000	73,500	12.3	18.8	30,135.00	13,818.00	43,953.00
290	Commercial	776.0	775.8	0.2	1,015,000	304,500	6.0	6.1	60,900.00	18,574.50	79,474.50
291	Commercial	782.4	782.0	0.4	140,000	42,000	8.1	10.3	11,340.00	4,326.00	15,666.00
292	Commercial	778.8	778.6	0.2	118,000	35,400	6.0	6.1	7,080.00	2,159.40	9,239.40
293	Residential	778.8	778.6	0.2	54,000	16,200	6.0	6.1	3,240.00	988.20	4,228.20
294	Commercial	778.8	778.7	0.1	210,000	63,000	5.0	4.0	10,500.00	2,520.00	13,020.00
295	Commercial	778.0	779.0	0.0	0	0	0.0	0.0	0.00	0.00	0.00
296	Residential	783.5	781.8	1.7	44,500	13,350	19.7	32.6	8,766.50	4,352.10	13,118.60
297	Residential	783.5	782.0	1.5	46,000	13,800	18.2	29.8	8,372.00	4,112.40	12,484.40
298	Residential	783.5	780.5	3.0	0	0	26.7	46.0	0.00	0.00	0.00
299	Residential	783.5	782.2	1.3	49,500	14,850	16.6	27.1	8,217.00	4,024.35	12,241.35
300	Residential	783.5	782.0	1.5	71,500	21,450	18.2	29.8	13,013.00	6,392.10	19,405.10
301	Residential	783.5	782.3	1.2	43,000	12,900	15.9	25.7	6,837.00	3,315.30	10,152.30
302	Commercial	783.5	782.0	1.5	20,000	6,000	18.2	29.8	3,640.00	1,788.00	5,428.00
303	Commercial	783.5	783.0	0.5	42,000	12,600	9.1	12.4	3,822.00	1,562.40	5,384.40
304	Commercial	783.5	783.4	0.1	17,000	5,100	5.0	4.0	850.00	204.00	1,054.00

TABLE NOTES:

Index No. (Index Number): Reference number used to relate each lot back to the City of Eau Claire's property assessment database parcel number.

Generalized Land Use: General land use of the parcel based on the *Property Class* description used in the City of Eau Claire's property assessment database.

Reg. Flood Elevation (Regional Flood Elevation): The estimated level of water at which a flood is considered to be a regional, 100-year, flood.

Est. Structure Elevation (Estimated Structure Elevation): The estimated elevation of the structures lowest floor.

Flood Level: The estimated level of flooding within a structure during a regional flood. This was calculated by subtracting the *Estimated Structure Elevation* from the *Regional Flood Elevation*.

Est. Fair Mkt. Value (Estimated Fair Market Value): The *Estimated Fair Market Value* of the structure(s) on each parcel was obtained from the *Improved Assessment* entry in the City of Eau Claire's property assessment database.

Est. Content Value (Estimated Content Value): The data for this calculation was taken from the *Design Manual for Retrofitting Flood-prone Residential Structures*, Federal Emergency Management Agency, Table 20, *Cost of Damages Example*, p. 188. Based on the Design Manual, the value of the contents of the structure(s) was determined to be 30% of the *Estimated Fair Market Value*. Consequently, the *Estimated Content Value* was calculated by multiplying the *Estimated Fair Market Value* by 0.30 (30%).

Percent Damage Structure: The estimate of structural damage as a percentage of fair market value by water depth within the structure. The data for this calculation was taken from the *Design Manual for Retrofitting Flood-prone Residential Structures*, Federal Emergency Management Agency, Table 17, *Damages as Percent of Value (by water depth)*, p. 184. (see Appendix D). Damages for structures were based on the average structure damages, as a percentage of value, for a one-story house without basement, split-level house without basement, and two-story house without basement. These generalizations were necessary because more specific data on the individual structures was not available.

Percent Damage Contents: The estimate of content damage as a percentage of fair market value by water depth within the structure. The data for this calculation was taken from the *Design Manual for Retrofitting Flood-prone Residential Structures*, Federal Emergency Management Agency, Table 17, *Damages as Percent of Value (by water depth)*, p. 184. (see Appendix D). Damages for contents were based on the average content damages, as a percentage of value, for a one-story house without basement, split-level house without basement, and two-story house without basement. These generalizations were necessary because more specific data on the individual structures was not available.

Value Damage Structure: The value of the damage to the structure based on the *Estimated Fair Market Value* of the structure times the *Percent Damage Structure*.

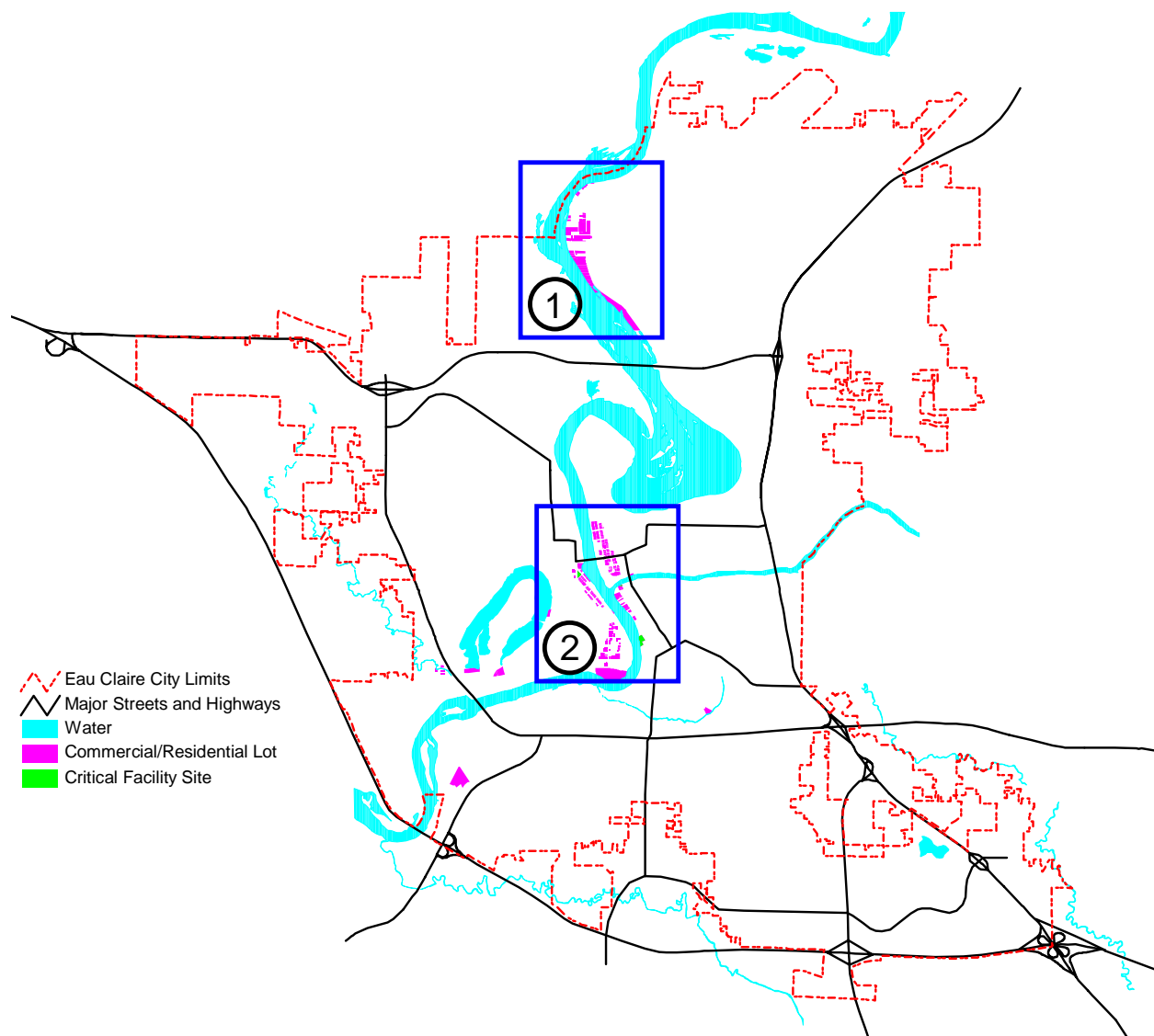
Value Damage Contents: The value of the damage to the structures contents based on the *Estimated Content Value* times the *Percent Damage Contents*.

Total Value Damages: The total value of damages to the structure and its contents based on the totaling of *Value Damage Structure* and *Value Damage Contents*.

DISCLAIMER

Efforts were taken to include only those structures that were located within the 100-year floodplain. The identification of structures and associated data is based on the best available data sources. Failure to include a structure in the floodplain does not necessarily mean that it is above the regional flood elevation; likewise, properties indicated as being in the regional floodplain may actually be high enough to be outside of its boundaries.

**FIGURE 9. Properties with Potentially Floodprone Structures
City of Eau Claire**



**FIGURE 9-1. Properties with Potentially Floodprone Structures - North
City of Eau Claire**

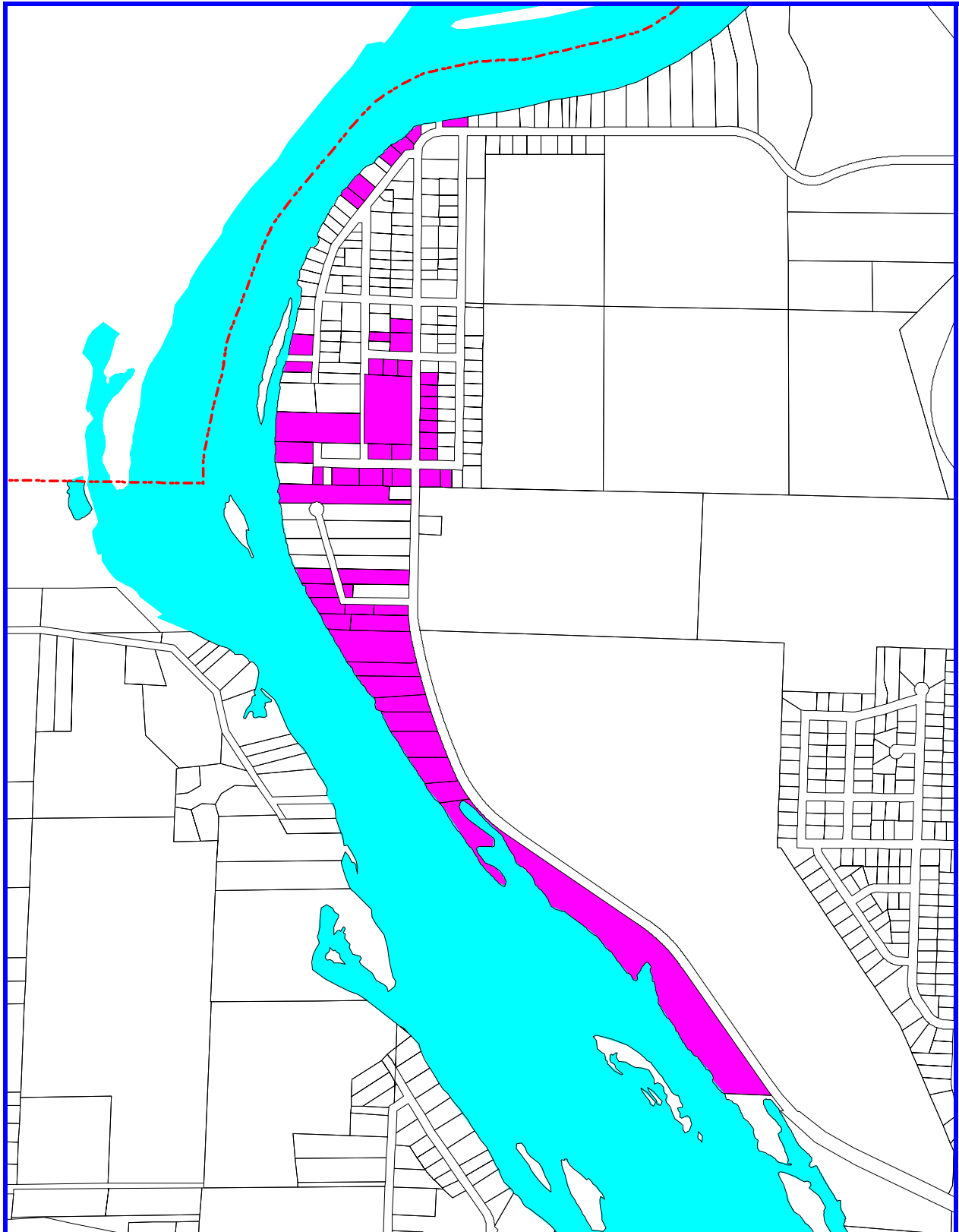
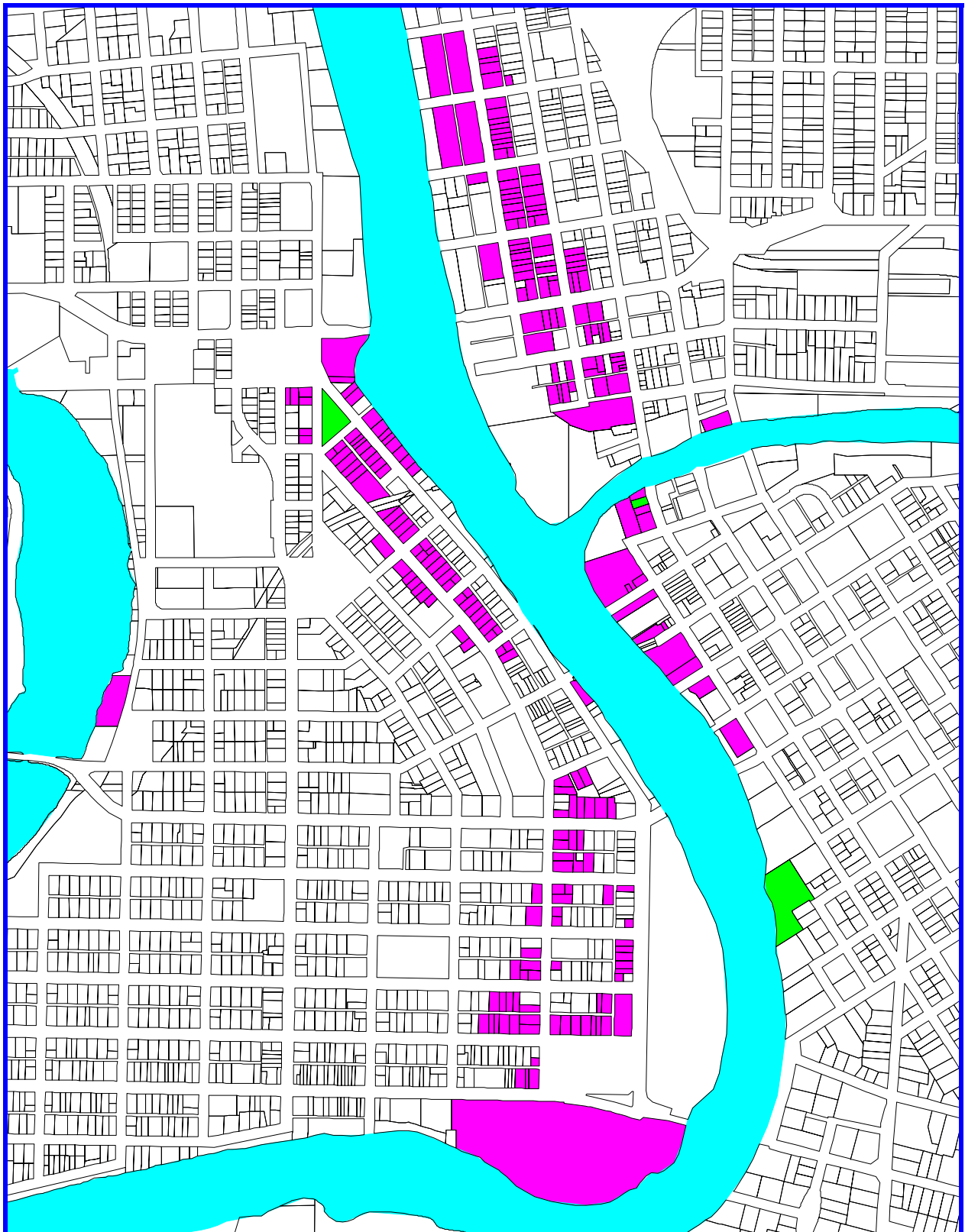


FIGURE 9-2. Properties with Potentially Floodprone Structures - Central City of Eau Claire



Repetitive Loss Properties

Repetitive loss properties are those properties participating in the National Flood Insurance Program (NFIP) that have filed two or more claims of \$1,000 or more in a 10-year period. This list is regularly compiled by FEMA and made available to the Wisconsin Division of Emergency Management.

As of December 2001, the City of Eau Claire had no properties listed on FEMA's repetitive loss properties list.

Critical Facilities in the Floodplain

In addition to identifying residential and general commercial structures that may be located in the 100-year floodplain, the City of Eau Claire is also concerned about mitigating the impacts of floods on critical facilities. Critical facilities can generally be thought of as those facilities that can directly impact, or are important to maintaining, the health, safety and welfare of residents. Examples of these types of facilities could include police and fire stations, hospitals, or chemical manufacturing or storage facilities.

In order to identify these facilities in Eau Claire, city staff worked with various City departments and Eau Claire County Emergency Government to gather lists of varying types of facilities. These lists included:

- educational facilities including:
 - daycare facilities and preschools
 - public and private elementary, middle and high schools
 - post-secondary institutions
- city buildings and facilities
- law enforcement and emergency response facilities
- hospitals and clinics
- nursing homes
- historic landmarks
- chemical storage facilities

Based on a review of these facilities to determine their locations on the Official Floodplain Zoning Map, three critical facilities were identified as possibly being wholly or partially within the 100-year floodplain. These facilities include one public building (Index No. 26), a nursing home (Index No. 255), and a historic building (Index No. 287). None of the critical facilities are chemical storage facilities.

Although portions of these critical facilities were found to be located within the floodplain using the official floodplain map, it is important to remember that an actual survey of the site may be necessary to determine the exact floodplain and building elevations and the risk to the associated property and residents.

FLOOD MITIGATION ACTIVITIES

The floodplain management activities in the City of Eau Claire have primarily included the use of land use controls to prevent the placement of new structures or other inappropriate uses in the regional floodplain and buyout programs. Over the past 30 years, these activities have combined to limit and reduce the number of structures and residents at risk from flooding. The following

section will describe the existing land use controls, flood mitigation grant/buyout programs, and warning and evacuation procedures used by the City of Eau Claire to reduce or eliminate the threat of flood events.

Floodplain Zoning

In order to manage development in the floodplain, the City of Eau Claire has adopted a floodplain ordinance (Chapter 18.11 - Floodplain Overlay District), shown in Appendix C. The purpose of this zoning district is *“To regulate development in flood hazard areas to protect life, health and property the governing body does ordain. The purpose of these rules is to: protect life, health and property; minimize expenditures of public monies for costly flood control projects; minimize rescue and relief efforts, generally undertaken at the expense of the tax paying public; minimize business interruptions which usually result in the loss of local incomes; minimize damage to public facilities on the floodplains such as water mains, sewer lines, streets and bridges; minimize the occurrence of future flood blight areas on floodplains; discourage the victimization of unwary land and home buyers; and prevent increases in regional flood heights that could increase flood damage and may result in conflicts or litigation between property owners.”* To date, the implementation and enforcement of the Floodplain Overlay District has effectively controlled the number of residents and structures at risk from flooding.

Buyout Programs • Hazard Mitigation Grant Program (HMGP)

In response to the 1993 floods, the City of Eau Claire established a flood buyout program for those areas directly affected by the flood. In 1995, the City applied for and was awarded Hazard Mitigation Grant Program funds that comprised the bulk of the buyout program funding. In total, nearly \$2.9 million were used to purchase (52) and flood proof (2) properties. Since the completion of the grant in December 1998, the City has also acquired two additional properties through the use of general tax dollars.

Additionally, as a result of property damaged during the September 10-11, 2000 flood event, the City has committed over \$9.0 million to acquire 35 properties and make public infrastructure improvements in the affected areas. To aid in this mitigation project, the City applied for and received \$1,488,562 of Hazard Mitigation Grant Program funds for the buy out of 10 properties located in the Taft/Kay area. In fact, since 1993, the City has received over \$3.8 million of flood emergency assistance funding. In total, the two flood buyout programs are expected to result in the acquisition of 87 flood prone properties in the City of Eau Claire.

Monitoring, Warning and Evacuation Procedures

One of the more important aspects involved in reducing the dangers of floods is the ability of the community to monitor flood conditions and warn and evacuate residents and visitors. Since the majority of the city is located within Eau Claire County, the city relies on, and works in close coordination and cooperation with Eau Claire County Emergency Management. More specifically, the City and County work together to monitor situations that have conditions which are favorable for developing into a flood. The city also relies on its own water level monitoring equipment, such as sonic level recorders and transmitters, located at the Grand Avenue pedestrian bridge and Lion’s Pavilion in Riverview Park. These gauges send continuous readings of the river level to the Public Works office located in City Hall and to the Wastewater Treatment Facility located on Ferry Street. In the event that a flood is imminent, the City also has developed procedures that it should take in order to properly respond to the flood and warn

residents. The specific actions taken by the City and each of its departments are outlined in the **Emergency Action Plan** section of the *City of Eau Claire Emergency Action Plan Natural Hazards – Floods* revised in January 2001.

Currently the City monitors four main types of flood conditions that could require notification and possibly evacuation of the potential flood area. These conditions include, but are not limited to, a developing flood associated with rivers or streams, flash flooding, overland flooding brought on by heavy rainfall, and a catastrophic flood event due to a dam failure.

The flooding of area rivers and streams is typically a result of persistent heavy rainfall or significant snowmelt during the spring. During these conditions the City utilizes a combination of resources to assist them in evaluating the potential flood conditions. Eau Claire County Emergency Management, the National Weather Service and Dam Tenders are used to obtain information on the potential flood conditions. This information is used to predict the crest of rising waters and time of the crest. The public is informed of changing conditions and predictions through an incident command system. This provides public awareness and notification. Typically, in this situation there is not an urgent, immediate need to evacuate people quickly. When it is determined that an area will be inundated by floodwaters the residents are notified by public service agencies that are monitoring conditions. People can evacuate with their own resources. Emergency service agencies ensure that notifications are received in the local area through announcements and door to door contacts as determined necessary.

When conditions are favorable for a flash flood, the National Weather Service issues a warning alerting people to the potential through radio, television, and weather alert radios. Conditions are monitored by emergency service agencies. When conditions begin to threaten an area, residents are notified through press releases and press interviews. Law enforcement and other emergency service agencies also notify residents of the advancing flood using public address systems on emergency vehicles and through door to door contacts. Since flash flooding can occur quickly, people are alerted as early as possible of the flood potential so they are aware and watchful of changing conditions. The observations of law enforcement and fire agencies add assistance in determining the timing and need for evacuations.

A dam break provides an entirely different situation. Currently there are four dams located upstream along the Chippewa River that could have some impact on city properties and residents. These are the Cornell Hydroelectric Project, Holcombe Hydroelectric Project, Jim Falls Hydroelectric Project, and Wissota Hydroelectric Project. In recognition of the potential for a catastrophic flood event, Xcel Energy is required to develop and maintain an Emergency Action Plan to be carried out if any of these facilities failed. In general, the dam tender is responsible for notifying downstream communities when a dam failure appears imminent. All emergency service agencies would be notified by simultaneous emergency radio broadcast of the need to evacuate. Residents would receive immediate warning through the National Weather Service and through local media. Emergency service responders would use public address systems and door to door contacts.

100-Year Flood Response Procedures

Although eliminating the exposure of residents and property to the risk of flooding is the most effective means of flood mitigation, some barriers may exist to being able to accomplish this objective in all areas of a community. In these situations, a community must then plan for their response to the events that might place these particular areas of their community at risk.

In the event of a 100-year flood, the city has formulated a response that is necessary to reduce the impacts of flooding to particular areas of the city. In general, the city is divided into five flood response work areas. Within these work areas the city has identified the problems that typically arise during flood events. The detailed response for each of these areas is described in the **Standard Operating Procedures** section of the *City of Eau Claire Emergency Action Plan Natural Hazards – Floods* revised in January 2001.

FLOOD MITIGATION GOALS AND OBJECTIVES

The goals and objectives are intended to provide direction to achieve the most desirable community outcome, and are to be used as guidelines by which flood mitigation activities and decisions are made.

The goal and objectives are intended to provide the City of Eau Claire with a vision for determining the future, desired outcome for flood hazard mitigation activities. The goal and objectives reflect the needs of the City as identified through the planning process, and are intended to serve as a guide for the development of the plan and the strategies and recommendations used to implement the plan.

For the purposes of this plan, the following are the definitions of goal and objective.

Goal: A general guideline that identifies the desired condition to be achieved. The goal is the desired destination if all of the objectives were developed to their fullest extent.

Objective: A specific, measurable outcome that is achievable and marks progress toward the goal. Objectives are the strategic steps required to reach the desired destination (goal).

The following is a summary of the goals and objectives that were drafted for this plan.

GOAL:

Protect the public health, safety and welfare.

Objective(s):

- Continue to access programs that provide funding to acquire and remove structures in floodprone areas, especially repetitive loss properties.
- Maintain an emergency action plan that outlines flood warning and evacuation procedures.
- Promote the development of public infrastructure and facilities that meet the standards necessary to maintain their operation during 100-year flood events.

GOAL:

Reduce flood damage.

Objective(s):

- Maintain development regulations to reduce risks to life and property in floodprone areas.
- Develop and maintain inventories of floodprone areas and structures at risk from flooding.
- Access programs that provide funding for property owners wanting to floodproof their structures.

- Access programs that provide funding to buyout properties in floodprone areas.
- Encourage the development/redevelopment of floodprone property into land uses suited to protect residents and property.

GOAL:

Promote the community's long-term economic prosperity.

Objective(s):

- Protect property values by eliminating blight in floodprone areas.

GOAL:

Promote the enhancement of the community through the implementation of flood mitigation activities.

Objective(s):

- Work with upstream communities to encourage the preservation and protection of natural features that can assist in the mitigation of flooding.
- Maintain and enhance the community's participation in the Community Rating System (CRS) program.
- Encourage the development/redevelopment of floodprone property into land uses that can enhance the quality-of-life of residents (e.g. recreation, open space, etc...).

FLOOD MITIGATION STRATEGIES & ACTION PLAN

POTENTIAL FLOOD MITIGATION STRATEGIES

There are a number of activities that can be used to mitigate the impacts of flooding on a community. It is important that a community consider a variety of possible alternatives to reduce flood losses, and protect and enhance the natural environment. To ensure that consideration was given to various alternative mitigation and management activities, the Flood Mitigation Committee and general public reviewed and evaluated the list of strategies and tools recommended by the *Unified National Program for Floodplain Management (FEMA Publication 248, 1994)*.

The Unified National Program lists four strategies and numerous tools to prevent or reduce flood losses and to preserve and restore the natural resources and functions and floodplains. Due to financial and other resource constraints, and Eau Claire's geographical location, not all of the strategies that are identified in the Unified National Program are realistic options to be implemented. The following is a comprehensive summary of the strategies and tools from the Unified National Program for Floodplain Management.

Strategies and Tools from the Unified National Program for Floodplain Management

Strategy 1: Modify human susceptibility to flood damage and disruption by avoiding hazardous, uneconomic, or unwise use of floodplains. Tools include:

- Floodplain regulations, e.g. zoning, to steer development away from hazardous areas or natural areas deserving preservation; subdivision regulations; and building, health and sanitary codes.
- Development and redevelopment policies on the design and location of public services, utilities, and critical facilities; land acquisition; open space preservation; and permanent relocation of buildings.
- Floodproofing of new buildings and retrofitting of existing ones.
- Flood forecasting, warning systems, and emergency plans that prepare people and property for flooding.
- Preservation and restoration of the natural resources and functions of floodplains.

Strategy 2: Modify the impact of flooding by assisting individuals and communities to prepare for, respond to, and recover from floods. Tools include:

- Information and education to assist self-help and protection measures.
- Flood emergency measures to protect people and property during the flood.
- Disaster assistance, flood insurance, and tax adjustments to reduce the financial impact of flooding.
- Post flood recovery plans and programs to help people rebuild and implement mitigation measures to protect against future floods.

Strategy 3: Modify flooding through projects that control floodwaters. Tools include:

- Dams and reservoirs that store excess waters upstream of development.
- Dikes, levees and floodwalls that keep waters away from developed areas.
- Channel alterations that make the channel more efficient so overbank flooding will be less frequent.
- High flow diversions that send excess waters off to undeveloped areas.
- Land treatment to hold as much rain as possible where it falls so it can infiltrate instead of running off.
- On-site detention measures to store excess runoff and flood flows.
- Shoreline protection measures that protect inland development and account for the natural movement of shoreland features.

Strategy 4: Preserve and restore the natural resources and functions of floodplains by maintaining and reestablishing floodplain environments in their natural state. Tools include:

- Floodplain, wetlands, and coastal barrier resources regulations, e.g. zoning, to steer development away from hazardous areas or natural areas deserving preservation; subdivision regulations; and building, health and sanitary codes.
- Development and redevelopment policies on the design and location of public services, utilities, and critical facilities; land acquisition; open space preservation; permanent relocation of buildings; restoration of floodplains and wetlands; and preservation of natural functions and habitats.
- Information and education to make people aware of natural floodplain resources and functions and how to protect them.
- Tax adjustments to provide a financial encouragement for leaving lands in their natural state.

CITY OF EAU CLAIRE ACTION PLAN

The following is an analysis of various floodplain management and mitigation activities for the City of Eau Claire. The recommended actions are based on Eau Claire's current exposure to the negative impacts of flooding and the City's potential to achieve the desired mitigation goals and objectives based on available resources. It is recognized that due to these and other potential constraints, not all recommended measures may be implemented according to schedule.

For the purposes of this plan, the floodplain management and mitigation activities were classified into five main categories of activities. The activities are defined as follows:

Planning and Regulation - Land use, zoning and other regulatory tools that guide development away from, or place special conditions on development in, floodprone areas. Planning and regulation are considered preventative measures that can help the community to prepare for impending flood disasters in order to minimize potential loss of life and property. These activities can also be used to preserve the environment and maintain or restore natural areas or the natural functions of floodplains and watershed.

Property Protection - Acquisition, relocation, floodproofing or insuring of floodprone properties, structures or residents.

Engineering - Construction and maintenance of structures to confine, detain or divert floodwaters.

Alert, Warning and Emergency Response - Flood forecasting and warning, and emergency response systems which are critical in taking action to safeguard lives and property.

Public Information and Education - Raising the awareness of current and potential property owners, and visitors of flooding issues, and informing and preparing them on how to respond before, during and after flood disasters. These activities can also include educating residents and visitors on the natural and beneficial functions of local floodplains.

Each recommended flood management or mitigation action will include the following information:

Problem: Statement of the identified problem.

Recommended Strategy: Recommended strategy to resolve the problem.

Responsible Agency: Agency responsible to implement the recommended strategy.

Potential Funding Sources: Potential sources of funding to implement the strategy.

Implementation Schedule: Estimated dates for beginning and completing the implementation of the strategy.

Estimated Cost: Where possible, an approximate cost to implement the recommended strategy was included.

Where appropriate the responsible agency will evaluate alternative potential funding sources and other agencies that could provide support for the implementation of the strategy. In all cases the responsible agency will evaluate potential funding sources and clarify which agencies will provide funding for the project. The responsible agency will also work to ensure that duplicate benefits are not received from the participating agencies. It is at this time that more specific cost estimates for the mitigation projects would be identified. Shown in Appendix G, is a list of agencies having programs that may provide funding in order to implement a strategy.

PLANNING AND REGULATION

RECOMMENDATION – 1

Problem: Lack of a flood mitigation plan, and existing plans that affect flood mitigation and management activities are outdated and no longer reflect current conditions.

Recommended Strategy: The City of Eau Claire should develop a Flood Mitigation Plan. The Flood Mitigation Plan should be reviewed annually in order to ensure that the plan accurately reflects the current conditions, and to evaluate the City's progress towards completion of the recommendations identified in the plan. In addition, the City should review other plans to ensure that they are consistent with the flood mitigation goals, objectives and implementation strategies.

Responsible Agency: Eau Claire Community Development Department

Potential Funding Sources: City of Eau Claire, FEMA

Implementation Schedule: Ongoing; Annually

Estimated Cost: \$20,000

RECOMMENDATION – 2

Problem: Floodplain zoning and management tools should be kept current with the Wisconsin Department of Natural Resources floodplain management standards and comply with National Flood Insurance Program (NFIP) regulations.

Recommended Strategy: The City of Eau Claire should complete a review of its floodplain zoning ordinance, and any other regulatory tools used to mitigate the impacts of flooding, to ensure that they comply with current federal and state regulations and are appropriate to achieve the floodplain mitigation goals and objectives. In addition, the City should regularly review and update appropriate ordinances in order to ensure compliance with NFIP regulations.

Responsible Agency: Eau Claire Community Development Department

Potential Funding Sources: City of Eau Claire

Implementation Schedule: Ongoing; Annually

Estimated Cost: Unknown

RECOMMENDATION – 3

Problem: The safety and welfare of residents and emergency personnel are at risk in areas where access has been restricted due to the flooding of highways, bridges and local access/egress roads.

Recommended Strategy: The City of Eau Claire should periodically review the transportation system in order identify impediments for evacuating residents or for the provision of emergency services during a regional flood. Identified locations should be considered during the development of a City emergency response plan and in the planning and design of transportation rehabilitation projects.

Responsible Agency: Eau Claire Community Development, Fire, Police and Public Works Departments

Potential Funding Sources: City of Eau Claire

Implementation Schedule: Ongoing

Estimated Cost: Unknown

PROPERTY PROTECTION

RECOMMENDATION – 4

Problem: Repetitive loss properties.

Recommended Strategy: Although the City of Eau Claire currently has no properties that are considered as repetitive loss by FEMA, the City should actively monitor FEMA's list of repetitive loss properties, and have procedures in place in order to acquire or relocate these properties should funding become available.

Responsible Agency: Eau Claire Community Development Department

Potential Funding Sources: City of Eau Claire, DNR, FEMA

Implementation Schedule: Ongoing; Annually

Estimated Cost: Unknown

RECOMMENDATION – 5

Problem: Structures at risk of flood damage.

Recommended Strategy: The City of Eau Claire should continue to pursue available hazard mitigation funding in order to acquire and remove or floodproof structures at risk of flood damage.

Responsible Agency: Eau Claire Community Development Department

Potential Funding Sources: City of Eau Claire, FEMA, DNR

Implementation Schedule: Ongoing

Estimated Cost: Unknown

ENGINEERING

RECOMMENDATION – 6

Problem: The potential for damages from flooding caused by the failure of the dike/levee along Forest Street.

Recommended Strategy: Although the City has aggressively reduced the flood damage potential along Forest Street through property buyout programs, there is still a considerable number of residences and businesses located in that neighborhood. Should the existing “levee” that provides flood protection to this area of the city fail during a flood event, a significant portion of the neighborhood could be at risk. In order to assess the possible flood risk, the City should commission an engineering study of the structural integrity of the levee located along Forest Street.

Responsible Agency: Eau Claire Public Works Department

Potential Funding Sources: City of Eau Claire

Implementation Schedule: Completed by December 2007

Estimated Cost: \$30,000

RECOMMENDATION – 7

Problem: 100-year rainstorm events may cause excessive runoff into the existing stormwater drainage system.

Recommended Strategy: As a result of neighborhood flooding that occurred due to heavy rains experienced on September 10-11, 2000, the City hired Barr Engineering Company to conduct studies of the four areas of the City that experienced the highest level of property damage. Based on the Barr Report and additional neighborhood assessments conducted by the Public Works Department (shown in Appendix B), prioritized recommendations were made for nearly 30 areas. These recommendations include the purchase and removal of homes, construction of stormwater detention facilities and improvements to the stormwater drainage system. Consequently, the City should continue to acquire property, develop needed detention facilities and make improvements to the stormwater drainage system as funding becomes available.

Responsible Agency: Eau Claire Public Works Department

Potential Funding Sources: City of Eau Claire, FEMA

Implementation Schedule: Ongoing

Estimated Cost: Unknown

ALERT, WARNING AND EMERGENCY RESPONSE

RECOMMENDATION – 8

Problem: Potential for the flood emergency response plan to become outdated/obsolete, and for the City organizational structure or emergency response agencies to change and thus alter the command and control structure of the City.

Recommended Strategy: The City of Eau Claire currently has a very detailed and well thought out Flood Emergency Action Plan. The plan also includes an Emergency Action Plan that outlines the responsibilities of the various departments and divisions.

The City should regularly review and revise as necessary the Flood Emergency Action Plan. As part of the evaluation and revision, the City should also develop and maintain a detailed incident command system. The incident command system would document the roles and responsibilities of the various agencies and personnel that could be involved in responding to a flood event.

Responsible Agency: Eau Claire Human Resources Department

Potential Funding Sources: City of Eau Claire

Implementation Schedule: Ongoing; Annually

Estimated Cost: Unknown

PUBLIC INFORMATION AND EDUCATION

RECOMMENDATION – 9

Problem: The general public is unaware of, or quickly forgets, the potential for flooding and the impact that floods can have on a community.

Recommended Strategy: The City of Eau Claire, in cooperation with Eau Claire and Chippewa Counties and other local communities, should annually publicize the potential for flooding and the related safety procedures to observe during flooding events.

Responsible Agency: City of Eau Claire

Potential Funding Sources: City of Eau Claire

Implementation Schedule: Ongoing; Annually

Estimated Cost: \$5,000

SECTION VII.

PLAN REVIEW & REVISION AND POST DISASTER PROCEDURES

PLAN REVIEW AND REVISION

The Eau Claire Flood Mitigation Plan will need to be evaluated on a regular basis in order to determine if the plan has become obsolete or no longer reflects the current conditions of the City. The City of Eau Claire Risk Manager in conjunction with the Emergency Preparedness Committee shall complete the periodic reviews. The initial review shall be completed within one year of the completion and adoption of the plan by the City Council, and annually thereafter. At that time the Committee shall consider the following:

1. Review of general development trends.
2. Review of the City's current flood risk to its residents and property.
3. Review of flood mitigation goals and objectives.
4. Review of the completed mitigation activities and their effectiveness.
5. Review of the recommended strategies.
6. Review of available resources for future projects.
7. Public input into the flood mitigation plan review.
8. Input from Wisconsin Emergency Management (WEM) and Federal Emergency Management Agency (FEMA) regarding implementation of the plan.

After completion of the review process, the Committee shall recommend revisions to the plan as necessary. The revisions shall be forwarded to the City Council for their consideration and action. All recommended revisions to the plan shall be carried out in accordance with the City's required public review and comment process. Any action taken by the City Council shall become effective upon Council approval.

POST DISASTER PROCEDURES

After the occurrence of a significant flood event, the information and recommended strategies included in this plan may need to be reviewed. This review should take place within three to six months after such an occurrence. After this review, the Committee may need to revise the existing plan to reflect any additional mitigation issues, recommendations or activities based on the circumstances and consequences of the disaster that occurred.

Information regarding the recent disaster shall be collected from those directly affected by the disaster. Information shall be requested from local law enforcement personnel, fire department personnel, City of Eau Claire disaster response personnel, DNR, WEM and FEMA personnel, and any other relevant entity. This information shall be provided to the Committee for their review. Any recommended changes to the plan shall be presented to the City Council as described under the ***Plan Review and Revision*** section. Upon approval of the proposed revisions, the Risk Manager and Committee should resume implementation of the plan.

APPENDIX A.

EAU CLAIRE CITY COUNCIL ADOPTING RESOLUTION

APPENDIX B.

EAU CLAIRE STORMWATER DRAINAGE MITIGATION PROJECTS

STORMWATER DRAINAGE PROBLEM AREAS

June 1 and September 10/11, 2000 Rainfalls

HIGH PRIORITY MITIGATION PROJECTS

#. LOCATION BY STREET

• FLOOD-RELATED PROBLEMS	• RECOMMENDED SOLUTIONS
<hr/>	
1. Taft & Kay (see Barr Report)	
<ul style="list-style-type: none"> • Street and property flooding, sewage backup, property damage, collapsed basement • Low area, pipe outlet 	<ul style="list-style-type: none"> • Alt. TK-1, Remove houses (11) and construct detention pond
2. Florence/Necessity/Bell (see Barr Report)	
Raedel Road – 1500 Block (Area #13)	
<ul style="list-style-type: none"> • Street and property flooding, property damage • Low area pipe outlet 	<ul style="list-style-type: none"> • Alt. FN-1, Remove homes (18) and construct detention pond
3. Dorret/Kohlhepp	
<ul style="list-style-type: none"> • Street and property flooding, property damage • Low area, pipe outlet 	<ul style="list-style-type: none"> • Alt. NC-1, Acquire land and construct detention ponds
4. Gooder/LaSalle	
<ul style="list-style-type: none"> • Street and property flooding, sewage backup, property damage • Low area, drainage ditch with limited outlet elevation and capacity 	<ul style="list-style-type: none"> • Alt. LG-1, Pursue land acquisition and easements for overland drainage • LG-2 Long Term, Coordinate with WisDOT on USH 53 freeway project
5. Platt and Oxford	
<ul style="list-style-type: none"> • Street and property flooding, collapsed pipe and street • CMP storm sewer replaced with RCP pipe and upgraded to 72" diameter 	<ul style="list-style-type: none"> • Work completed November, 2000
12. E. Hamilton Avenue – 600 Block	
<ul style="list-style-type: none"> • Street flooding, property damage • Low spot in roadway, house and driveway below road 	<ul style="list-style-type: none"> • Raise height of first floor or acquire house at 605 E. Hamilton Avenue
15. Preston Road @ Truax Blvd. – Sherman Creek Outfall	
<ul style="list-style-type: none"> • Street flooding, property damage • Low area, no outlet, runoff pumped to Sherman Creek from September storm 	<ul style="list-style-type: none"> • Construct drainage improvements as recommended (2001 CIP)

#. LOCATION BY STREET**• FLOOD-RELATED PROBLEMS****• RECOMMENDED SOLUTIONS**

19. Wells Road – North Slope

- Slope failure
- Geotechnical analysis completed by STS Consultants and plans prepared
- Permanent repairs scheduled for Spring, 2001

20. Luther Hospital Campus

- Basement and property flooding
- Low areas on site concentrating runoff to entry points into the building with limited pipe outlet capacity
- Work with Mayo/Luther to identify feasible pipe capacity projects
- Construct as part of street improvement projects in the area

34. Indianhead Foods/Morningside Dr.

- Street and property flooding, property damage and slope erosion
- Low area in the street overtopping system and flowing down the steep bank
- Temporary modifications to system and driveways on Morningside Drive
- Private property owners improvements and modifications
- Galloway Street extension in 2003/2004 to provide additional drainage capacity and outlet to Eau Claire River

37. First Street – 2600 Block

- Street flooding, low spot in road
- Water overtops curb and flows through yard causing property damage and erosion
- Acquire property at 2611 First Street
- Construct emergency overflow route to Chippewa River

43. Locust Lane and Abbe Hill Drive

Leslie Lane & Abbe Hill Drive (Area #26)
Eddy Lane & Kilbourne Avenue (Area #36)
S. of Terry Lane (Area #39)
Hastings Way (USH 53) &
Landon (Area #44)

- Street and property flooding, property damage and basement collapse
- Low area, yards below street elevation, pipe outlet
- Surface runoff from school fields into limited capacity pipe in the back yards
- Property owners working with School District runoff from the play fields
- Acquire property at 3020 Locust Lane
- Construct stormwater detention area
- Complete XP-SWMM model of watershed area

46. White Avenue Storm Sewer Outfall – to Campbell Pond

- On going erosion problems, see report dated August, 2000
- Reroute outfall, included in 2001 CIP

51. Gray Street Outfall to Chippewa River

- CMP outfall with deteriorating invert
- Replace pipe, 2001 CIP

MEDIUM PRIORITY MITIGATION PROJECTS

#. LOCATION BY STREET

• FLOOD-RELATED PROBLEMS

• RECOMMENDED SOLUTIONS

6. Ellis and Fillmore

- | | |
|---|--|
| <ul style="list-style-type: none"> • Street flooding, property damage • Low spot in road, pipe outlet | <ul style="list-style-type: none"> • Flood proof structures • Construct relief storm sewer, included in 2005 CIP |
|---|--|

17. Maywood Drive Backyard Drainage

- | | |
|--|---|
| <ul style="list-style-type: none"> • Property flooding, property damage • Rear yard drainage ditch overflow into back yard | <ul style="list-style-type: none"> • Flood proofing and protection |
|--|---|

22. Highland and Agnes

- | | |
|--|--|
| <ul style="list-style-type: none"> • Street flooding, low spot in road, pipe outlet | <ul style="list-style-type: none"> • Construct relief storm sewer, included in 2002 CIP |
|--|--|

24. 14th Street and Platt Street

- | | |
|--|--|
| <ul style="list-style-type: none"> • Street runoff overflows driveway causing property damage • Low spot in road, pipe outlet, driveway below street elevation | <ul style="list-style-type: none"> • Modify driveway design and elevations, pave driveway |
|--|--|

29. Nestle and Otis

- | | |
|--|---|
| <ul style="list-style-type: none"> • Street flooding, property damage, basement collapse • Low spot in road, pipe outlet | <ul style="list-style-type: none"> • Street improvements on Otis Street • Construct westside relief storm sewer, 2004 CIP |
|--|---|

30. 13th Street and Bolles

- | | |
|--|---|
| <ul style="list-style-type: none"> • Street and property flooding, property and pipe damage • Low area, pipe outlet, rear yards below street elevation | <ul style="list-style-type: none"> • Flood proof properties • Construct westside relief storm sewer, 2004 CIP |
|--|---|

31. St. James Churst (11th Street and Marshall)

- | | |
|--|---|
| <ul style="list-style-type: none"> • Property flooding and property damage • Low area behind building, pipe outlet with limited capacity, surcharged | <ul style="list-style-type: none"> • Change building entrance elevation • Flood proof property • Construct westside relief storm sewer, 2004 CIP |
|--|---|

32. University Avenue Outfall Pipe

- | | |
|--|--|
| <ul style="list-style-type: none"> • Pipe overflow from hydraulic grade and slope erosion | <ul style="list-style-type: none"> • Upgrade pipe hydraulics and reinforce overflow route |
|--|--|

33. Otter Creek Outfall Pipe

- | | |
|--|--|
| <ul style="list-style-type: none"> • Pipe overflow creating overland flow and slope erosion | <ul style="list-style-type: none"> • Upgrade pipe hydraulics and reinforce overflow route |
|--|--|

#. LOCATION BY STREET**• FLOOD-RELATED PROBLEMS****• RECOMMENDED SOLUTIONS**

41. Dells Pond Slope (west of Starr Avenue & Railroad Tracks)

- Surface water runoff caused bank erosion and incised the slope
- Repair and reinforce bank, 2001

42. Greene Property (south of Birch Street to Eau Claire River)

- Surface water runoff caused bank erosion and incised the slope from Birch Street (CTH "Q") to the Eau Claire River
- Private property, evaluate repair and upgrade alternatives
- Include new outfall in 2003/2004 CIP as part of USH 53 freeway project

52. Hertz Car Lot – Highway 93

- Low area along highway ditch
- Highway 53 freeway project will look at improvements in this area
- Flood proof property
- Upgrade drainage ditch as part of USH 53 freeway project, 2004/2005 CIP

53. American Phoenix – Galloway Street

- Surface water from street into doors of Banbury Place building
- Upgrade drainage as part of Galloway Street project planned for 2001

LOW PRIORITY MITIGATION PROJECTS

#. LOCATION BY STREET**• FLOOD-RELATED PROBLEMS****• RECOMMENDED SOLUTIONS**

16. Truax Blvd. West of 14th Street

- Ditch and construction site erosion
- Street construction project scheduled in CIP for 2004

47. State Street Storm Sewer Outfall to Putnam Park

- Debris and sand in storm sewer outfall
- Clean outfall of sand and debris

NO WORK PLANNED AT THIS TIME

7. Horlacher Lane

- Construction site erosion

8. Target/Menards Development Area

- Construction site erosion

9. House Road and Otter Creek Court

- Flooded street and overflow from detention pond (June storm only)
- Construction of the House Road project in the summer of 2000, which included storm sewer and expansion of the detention ponds addressed the problem that was encountered from the June storm. No reported problems from the September storm.

10. Violet Street and Teal Court

- Street flooding, low spot in road, pipe outlet

11. LaMans Lane and Vienna Terrace

- Construction site erosion

14. Folsom Street (Epiphany Lane to North)

- Undeveloped site erosion

18. Delong Middle School Pond

- Detention pond full
- Construction on outfall structure in 1999 improved conditions downstream

21. Omaha and Davis

- Street flooding, low spot in road, pipe outlet

23. Essex and Brookline

- Street flooding, low spot in road, pipe outlet

25. Fairfax Park Detention Basins

- Construction site erosion from June storm
- Minor erosion from September storm, system functioned as planned

27. North Crossing (STH 124) North Ditch

- Ditch erosion and washout, repaired by Eau Claire County for WisDOT

28. Melanie and Mittelstadt

- Street flooding, low spot in road, pipe outlet

35. Brackett and Agnes

- Street flooding, low spot in road, pipe outlet

38. Diane Lane and Jeanne Lane

- Street flooding, low spot in road, pipe outlet

40. Frisbie and Jupiter

- Street flooding, low spot in road, pipe outlet

45. Hastings Way (USH 53) and Valmont

- Street flooding, low spit in road, pipe outlet

48. Stein and Hamilton

- Street and property flooding
- Low spot in road, areas of property below street elevation, pipe outlet

49. Sacred Heart Hospital and CVTC

- Property flooding and damage
- Roof and building drain pipe capacity, pipe outlet

50. Cummings and Wayne Place

- Street flooding
- Low spot in road, pipe outlet to detention pond and Lowes Creek outfall

54. Grissom Drive – Multi Family Property

- Preliminary review indicates a private property drainage problem not related to the City system

55. Lever Street Condominiums

- Preliminary review indicates a private property drainage problem not related to the City system

APPENDIX C.

CITY OF EAU CLAIRE FLOODPLAIN OVERLAY DISTRICT

Chapter 18.11

F - FLOODPLAIN OVERLAY DISTRICT

Sections:

- 18.11.010 Statutory authorization.
- 18.11.020 Finding of fact.
- 18.11.030 Statement of purpose.
- 18.11.040 Title.
- 18.11.050 Definition.
- 18.11.060 General provisions.
- 18.11.070 General standards applicable to all floodplain districts.
- 18.11.080 Floodway district (FW).
- 18.11.090 Standards for developments in floodway areas.
- 18.11.100 Flood fringe district (FF).
- 18.11.110 Standards for development in flood fringe areas.
- 18.11.120 General floodplain district (GFP).
- 18.11.130 Nonconforming uses and structures.
- 18.11.140 Floodway areas--Nonconforming uses and structures.
- 18.11.150 Floodfringe areas--Nonconforming uses and structures.
- 18.11.160 Administration.
- 18.11.170 Administrative procedures.
- 18.11.180 Plan commission
- 18.11.190 Board of appeals.
- 18.11.200 Review of appeals of permit denials.
- 18.11.210 Floodproofing.
- 18.11.220 Public information.
- 18.11.230 Amendments.
- 18.11.240 Enforcement and penalties.

18.11.010 Statutory authorization. This chapter is adopted pursuant to the authorization in ss.61.35, 62.23 and 87.30, Wis. Stats. (Ord. 5307, 1993.)

18.11.020 Finding of Fact. Uncontrolled development and use of the floodplains, rivers or streams of the city of Eau Claire would adversely affect the public health, safety, convenience, general welfare, and impair the tax base. (Ord. 5307, 1993).

18.11.030 Statement of purpose. To regulate development in flood hazard areas to protect life, health and property the governing body does ordain. The purpose of these rules is to:

- A. Protect life, health and property;
- B. Minimize expenditures of public monies for costly flood control projects;
- C. Minimize rescue and relief efforts, generally undertaken at the expense of the tax paying public;
- D. Minimize business interruptions which usually result in the loss of local incomes;
- E. Minimize damage to public facilities on the floodplains such as water mains, sewer lines, streets and bridges;
- F. Minimize the occurrence of future flood blight areas on floodplains;
- G. Discourage the victimization of unwary land and home buyers; and
- H. Prevent increases in regional flood heights that could increase flood damage and may result in conflicts or litigation between property owners. (Ord. 5307, 1993).

18.11.040 Title. This chapter shall be known as the Floodplain Zoning Ordinance for Eau Claire, Wisconsin. (Ord. 5307, 1993).

18.11.050 Definitions. Unless specifically defined below, words and phrases used in this chapter shall have the same meaning as they have at common law and to give this chapter its most reasonable application. Words used in the present tense include the future, the singular number includes the plural and the plural number includes the singular. The word "may" is permissive, "shall" is mandatory and not discretionary.

A. "A zones" mean those areas shown on the "Official Floodplain Zoning Map" which would be inundated by the "regional flood" as defined below. These areas may be numbered or unnumbered A Zones. The A Zones may or may not be reflective of flood profiles, depending on the availability of data for a given area.

B. "Accessory structure or use" means a detached subordinate structure or a use which is clearly incidental to and customarily found in connection with the principal structure or use to which it is related, and which is located on the same lot as that of the principal structure or use.

C. "Basement" means any enclosed area of a building having its floor subgrade, i.e., below ground level, on all sides.

D. "Building" - see structure.

E. "Bulkhead line" means a geographic line along a reach of navigable water that has been adopted by a municipal ordinance and approved by the Department of Natural Resources pursuant to s. 30.11, Wis. Stats., and which allows limited filling between this bulkhead line and the original ordinary highwater mark, except where such filling is prohibited by the floodway provisions of this chapter.

F. "Certificate of compliance" means a certification issued by the zoning administrator stating that the construction and the use of land or a building, the elevation of fill or the lowest floor of a structure is in compliance with all of the provisions of this chapter.

G. "Channel" means a natural or artificial watercourse with definite bed and banks to confine and conduct normal flow of water.

H. "Crawlways or crawl space" means an enclosed area below the first usable floor of a building, generally less than five (5) feet in height, used for limited access to plumbing and electrical utilities.

I. "Department" means the Wisconsin Department of Natural Resources.

J. "Development" means any artificial change to improved or unimproved real estate, including, but not limited to, the construction of buildings, structures or accessory structures; the construction of additions or substantial improvements to buildings, structures or accessory structures; the placement of buildings or structures; mining, dredging, filling, grading, paving, excavation or drilling operations; and the storage, deposition or extraction of materials, public or private sewage disposal systems or water supply facilities.

K. "Dryland access" means a vehicular access route which is above the regional flood elevation and which connects land located in the floodplain to land outside the floodplain, such as a road with its surface above regional flood elevation and wide enough for wheeled rescue and relief vehicles.

L. "Encroachment" means any fill, structure, building, use or development in the floodway.

M. "Existing manufactured or mobile home park or subdivision" means a parcel (or contiguous parcels) of land divided into two or more mobile home lots for rent or sale on which the construction of facilities for servicing the lots, including, at a minimum, the installation of utilities, either final site grading or the pouring of concrete pads, and the construction of streets, is completed before the effective date of this chapter.

N. "Expansion to existing mobile/manufactured home park" means the preparation of additional sites by the construction of facilities for servicing the lots on which the mobile homes are to be placed. This includes installation of utilities, either final site grading, pouring pads, or construction of streets.

O. "Federal emergency management agency (FEMA)" means the federal agency that administers the National Flood Insurance Program. This agency was previously known as the Federal Insurance Administration (FIA), or Department of Housing and Urban Development (HUD).

P. "Flood" or "Flooding" means a general and temporary condition of partial or complete inundation of normally dry land areas caused by:

(a) The overflow or rise of inland waters;

(b) The rapid accumulation or runoff of surface waters from any source; and

(c) The sudden increase caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as a seiche, or by some similarly unusual event.

Q. "Flood frequency" means the probability of a flood occurrence which is generally determined from statistical analyses. The frequency of a particular flood event is usually expressed as occurring, on the average, once in a specified number of years or as a percent (%) chance of occurring in any given year.

R. "Floodfringe" means that portion of the floodplain outside of the floodway which is covered by flood waters during the regional flood and generally associated with standing water rather than flowing water.

S. "Flood hazard boundary map" means a map prepared by FEMA designating approximate flood hazard areas. Flood hazard areas are designated as unnumbered A-Zones and do not contain floodway lines or regional flood elevations. Said map forms the basis for both the regulatory and insurance aspects of the National Flood Insurance Program.

T. "Flood insurance study" means a technical engineering examination, evaluation, and determination of the local flood hazard areas. It provides maps designating those areas affected by the regional flood and provides both flood insurance rate zones and regional flood elevations and may provide floodway lines. The flood hazard areas are designated as numbered and unnumbered A-Zones. Flood insurance study maps form the basis for both the regulatory and the insurance aspects of the National Flood Insurance Program.

U. "Floodplain" means that land which has been or may be hereafter covered by flood water during the regional flood. The floodplain includes the floodway and the floodfringe, and may include other designated floodplain areas for regulatory purposes.

V. "Floodplain island" means a natural geologic land formation within the floodplain that is surrounded, but not covered, by floodwater during the regional flood.

W. "Floodplain management" means the full range of public policy and action for insuring wise use of floodplains. It includes everything from the collection and dissemination of flood data to the acquisition of floodplain lands and the enactment and administration of codes, ordinances and statutes for land use in the floodplain.

X. "Flood profile" means a graph or a longitudinal profile line showing the relationship of the water surface elevation of a flood event to locations of land surface elevations along a stream or river.

Y. "Floodproofing" means any combination of structural provisions, changes or adjustments to properties and structures, water and sanitary facilities and contents of buildings subject to flooding, for the purpose of reducing or eliminating flood damage.

Z. "Flood protection elevation" means an elevation two feet of freeboard above the water surface profile elevation designated for the regional flood. (Also see: Freeboard.)

AA. "Flood storage" means those floodplain areas where storage of floodwaters has been taken into account during analysis in reducing the regional flood discharge.

BB. "Floodway" means the channel of a river or stream and those portions of the floodplain adjoining the channel required to carry the regional flood discharge.

CC. "Freeboard" means a flood protection elevation requirement designed as a safety factor which is usually expressed in terms of a specified number of feet above a calculated flood level. Freeboard compensates for the effects of any factors that contribute to flood heights greater than those calculated. These factors include, but are not limited to, ice jams, debris accumulation, wave action, obstruction of bridge openings and floodways, the effects of urbanization on the hydrology of the watershed, loss of flood storage areas due to development and aggregation of the river or stream bed.

DD. "Habitable buildings" means any building, or portion thereof used or designed for human habitation.

EE. "Hearing notice" means publication or posting meeting the requirements of Ch. 985, Wis. Stats., Class 1 notice is the minimum required for appeals: Published once at least one week (7 days) before the hearing. Class 2 notice is the minimum required for all zoning ordinances and amendments including map amendments: published twice, once each week consecutively, the last at least a week (7 days) before the hearing. Local ordinances or bylaws may require additional notice, exceeding these minimums.

FF. "High flood damage potential" means damage that could result from flooding that includes any danger to life or health or any significant economic loss to a structure or building and its contents.

GG. "Historic structure" (federal rule Oct. 1990) means any structure that is:

(a) Listed individually in the National Register of Historic Places or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

(b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

(c) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or

(d) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either by an approved state program, as determined by the Secretary of the Interior; or directly by the Secretary of the Interior in states without approved programs."

HH. "Increase in regional flood height" means a calculated upward rise in the regional flood elevation, equal to or greater than 0.01 foot, resulting by a comparison of existing conditions and proposed conditions which is directly attributable to development in the floodplain but not attributable to manipulation of mathematical variables such as roughness factors, expansion and contraction coefficients and discharge.

II. "Land use" means any nonstructural use made of unimproved or improved real estate. (Also see Development.)

JJ. "Mobile home" or "Manufactured home" means a structure transportable in one or more sections, which is built on a permanent chassis and is designed to be used with or without a permanent foundation when connected to required utilities. For the purpose of this chapter, it does not include recreational vehicles or travel trailers which remain licensed and ready for highway use and remain on-site less than 180 days.

KK. "Municipality" or "Municipal" means the county, city or village governmental units enacting, administering and enforcing this chapter.

LL. "NGVD" or "National geodetic vertical datum" means elevations referenced to mean sea level datum, 1929 adjustment.

MM. "Nonconforming structure" means an existing lawful structure or building which is not in conformity with the dimensional or structural requirements of this chapter for the area of the floodplain which it occupies. (For example, an existing residential structure in the floodfringe district is a conforming use. However, if the first floor is lower than the flood protection elevation, the structure is nonconforming.)

NN. "Nonconforming use" means an existing lawful use or accessory use of a structure or building which is not in conformity with the provisions of this chapter for the area of the floodplain which it occupies. (Such as a residence in the floodway.)

OO. "Obstruction to flow" means any development which physically blocks the conveyance of floodwaters such that this development by itself or in conjunction with any future similar development will cause an increase in regional flood height.

PP. "Official floodplain zoning map" means that map, adopted and made part of this chapter, as described in s. 18.11.060 B., which has been approved by the Department of Natural Resources and FEMA.

QQ. "Open space use" means those uses having a relatively low flood damage potential and not involving structures.

RR. "Ordinary highwater mark" means the point on the bank or shore up to which the presence and action of surface water is so continuous as to leave a distinctive mark such as by erosion, destruction or prevention of terrestrial vegetation, predominance of aquatic vegetation, or other easily recognized characteristic.

SS. "Person" means an individual, or group of individuals, corporation, partnership, association, municipality or state agency.

TT. "Private sewage system" means a sewage treatment and disposal system serving a single structure with a septic tank and soil absorption field located on the same parcel as the structure. This term also means an alternative sewage system approved by the department of industry, labor and human relations including a substitute for the septic tank or soil absorption field, a holding tank, a system serving more than one structure or a system located on a different parcel than the structure.

UU. "Public utilities" means those utilities using underground or overhead transmission lines such as electric, telephone and telegraph, and distribution and collection systems such as water, sanitary sewer and storm sewer.

VV. "Regional flood" means a flood determined to be representative of large floods known to have occurred in Wisconsin or which may be expected to occur on a particular lake, river or stream once in every 100 years.

WW. "Structure" means any manmade object with form, shape and utility, either permanently or temporarily attached to, placed upon or set into the ground, stream bed or lake bed, including, but not limited to, roofed and walled buildings, gas or liquid storage tanks, bridges, dams and culverts.

XX. "Substantial improvement" means any structural repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds fifty percent (50%) of the present equalized assessed value of the structure either before the improvement or repair is started, or if the structure has been damaged, and is being restored, before the damage occurred. The term does not, however, include either:

(a) Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which existed before the improvement began, was identified by a municipal official and are necessary to assure safe living conditions,

(b) Any alteration of a designated historical (see definition) structure or site documented as deserving preservation by the Wisconsin State Historical Society, or listed on the National Register of Historic Places provided the alteration will not preclude the structure's continued designation as an historical structure. Ordinary maintenance repairs are not considered structural repairs, modifications or additions. Such ordinary maintenance repairs include internal and external painting, decorating, paneling, and the replacement of doors, windows, and other nonstructural components. "Substantial improvement" begins when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure.

YY. "Unnecessary hardship" means where special conditions affecting a particular property, which were not self-created, have made strict conformity with restrictions governing areas, setbacks, frontage, height or density unnecessarily burdensome or unreasonable in light of the purposes of this chapter.

ZZ. "Variance" means an authorization by the board of appeals for the construction or maintenance of a building or structure in a manner which is inconsistent with dimensional standards (not uses) contained in this chapter.

AAA. "Watershed" means the entire region or area contributing runoff or surface water to a particular watercourse or body of water.

BBB. "Water surface profile" means a graphical representation showing the elevation of the water surface of a watercourse for each position along a reach of river or stream at a certain flood flow. A water surface profile of the regional flood is used in regulating floodplain areas.

CCC. "Well" means an excavation opening in the ground made by digging, boring, drilling, driving or other methods, to obtain groundwater regardless of its intended use. (Ord. 5307, 1993).

18.11.060 General provisions. A. Areas to be regulated. Areas regulated by this chapter include all areas within the limits of the city of Eau Claire that would be covered by the "regional flood" (defined in s. 18.11.050) and include "floodplain islands" (defined in s. 18.11.050) designated on the official map where emergency rescue and relief routes would be inundated by the regional flood.

B. Official map. The boundary of the floodplain districts including the floodway, flood fringe and other floodplain districts, are those areas designated as floodplains or A-Zones on the following maps: The City of Eau Claire, Wisconsin Official Flood Plain Zoning Map for the Chippewa River Flood Plain prepared by the engineering division of the city of Eau Claire. This map, dated March 29, 1993, is the official floodplain zoning map, has been approved by the Department of Natural Resources, and is on file in the inspection services office. This map is based upon the revised flood profiles using the revised regional flood discharge for the Chippewa River. The flood insurance rate map, prepared by FEMA, dated February 4, 1998, is also on file in the inspection services office. If more than one map is referenced the regional flood profiles govern boundary discrepancies according to par. D. below.

C. Establishment of districts. The regional floodplain areas are hereby divided into three districts defined in s. 18.11.050 and as follows:

1. The Floodway District (FW) consists of the channel of a river or stream and those portions of the floodplain adjoining the channel required to carry the regional flood waters.

2. The Floodfringe District (FF) consists of that portion of the floodplain between the regional flood limits and the floodway.

3. The General Floodplain District (GFP) consists of all areas which have been or may be covered by flood water during the regional flood. It includes both the floodway and floodfringe districts.

D. Locating floodplain boundaries. Where an apparent discrepancy exists between the location of the outermost boundary of the flood fringe district or general floodplain district shown on the official floodplain zoning map and actual field conditions, the location shall be initially determined by the zoning administrator using the criteria in paragraphs 1. or 2. below. Where the zoning administrator finds that there is a significant difference between the map and the actual field conditions, the map shall be amended using the procedures established in s. 18.11.230. Disputes between the zoning administrator and an applicant over the location of the district boundary line shall be settled according to s. 18.11.190 C.

1. Where flood profiles exist, the location of the district boundary line shall be determined by the zoning administrator using both the scale appearing on the map and the elevations shown on the water surface profile of the regional flood. Where a discrepancy exists between the map, and actual field conditions, the regional flood elevations shall govern. A map amendment is required where there is a significant discrepancy between the map and actual field conditions. The zoning administrator shall have the authority to grant or deny a land use permit on the basis of a district boundary derived from the elevations shown on the water surface profile of the regional flood, whether or not a map amendment is required. The zoning administrator shall be responsible for initiating any map amendments required under this section within a reasonable period of time.

2. Where flood profiles do not exist, the location of the district boundary line shall be determined by the zoning administrator using the scale appearing on the map, visual on-site inspection and any available information provided by the department. Where there is a significant difference between the map and actual field conditions, the map shall be amended. Where a map amendment has been approved by both the municipal governing body and the department, the zoning administrator shall have the authority to grant or deny a land use permit.

E. Removal of lands from floodplain. Compliance with the provisions of this chapter shall not be grounds for removing lands from the floodplain district, unless they are removed by filling to a height of at least two feet above the regional flood elevation, the fill is contiguous to land lying outside the floodplain district, and the map is amended pursuant to s. 18.11.230. To remove flood insurance requirements, FEMA must first revise the Flood Insurance Rate Map or issue a Letter of Map Amendment or Revision.

F. Compliance. Any development, as defined in s. 18.11.050, or use within the areas regulated by this chapter shall be in full compliance with the terms of this chapter, and other applicable local, state, and federal regulations.

G. Municipalities and state agencies regulated. Unless specifically exempted by law, all cities, villages, towns, and counties are required to comply with this chapter and obtain all necessary permits. State agencies are required to comply if s. 13.48(13), Wis. Stats., applies. The construction, reconstruction, maintenance and repair of state highways and bridges by the Wisconsin Department of Transportation are exempt when s. 30.12(4)(a), Wis. Stats., applies.

H. Abrogation and greater restrictions.

1. This chapter supersedes all the provisions of any municipal zoning ordinance enacted under s. 62.23, Wis. Stats., which relate to floodplains except that where another municipal zoning ordinance is more restrictive than the provisions contained in this chapter, that ordinance shall continue in full force and effect to the extent of the greater restrictions, but not otherwise.

2. This chapter is not intended to repeal, abrogate or impair any existing deed restrictions, covenants or easements. However, where this chapter imposes greater restrictions, the provisions of this chapter shall prevail.

I. Interpretation. In their interpretation and application, the provisions of this chapter shall be held to be minimum requirements liberally construed in favor of the governing body, and shall not be deemed a limitation on or repeal of any other powers granted by the Wisconsin Statutes. Where a provision of this chapter is required by a standard in Ch. NR 116, Wis. Adm. Code, and where the ordinance provision is unclear, the provision shall be interpreted in light of the ch. NR 116 standards in effect on the date of the adoption of this chapter or in effect on the date of the most recent text amendment to this chapter.

J. Warning and disclaimer of liability. The degree of flood protection provided by this chapter is considered reasonable for regulatory purposes and is based on engineering experience and scientific methods of study. Larger floods may occur or the flood height may be increased by man-made or natural causes such as ice jams or bridge openings restricted by debris. Therefore, this chapter does not imply that areas outside of the delineated floodplain; or permitted land uses within the floodplain, will be totally free from flooding and associated flood damages. Nor does this chapter create liability on the part of, or a cause of action against, the municipality or any officer or employee thereof for any flood damage that may result from reliance on this chapter.

K. Severability. Should any portion of this chapter be declared unconstitutional or invalid by a court of competent jurisdiction, the remainder of this chapter shall not be affected.

L. Annexed areas for cities and villages. The Eau Claire and Chippewa County floodplain zoning provisions in effect on the date of annexation shall remain in effect and shall be enforced by the municipality for all areas annexed by the municipality until the municipality adopts and enforces an ordinance which meets the requirements of ch. NR 116, Wis. Adm. Code. These annexed lands are described on the municipality's official zoning map. County floodplain zoning provisions are incorporated by reference for the purpose of administering this section and are on file in the office of the municipal zoning administrator. (Ord. 5785, 1997; Ord. 5307, 1993).

18.11.070 General standards applicable to all floodplain districts. A. Hydraulic and hydrologic analyses.

1. No development, except as provided in par. B. below, shall be allowed in floodplain areas which will:

a. Cause an obstruction to flow, defined in s. 18.11.050 as any development which physically blocks the conveyance of floodwaters by itself or in conjunction with future similar development causing an increase in regional flood height; or

b. Cause an increase in regional flood height due to floodplain storage area lost, which is equal to or exceeding 0.01 foot;

2. Obstructions or increases equal to or greater than 0.01 foot may only be permitted if amendments are made to this chapter, the official floodplain zoning maps, including floodway lines and water surface profiles, in accordance with s. 18.11.230, and only if the total cumulative effect of the proposed development will not increase the height of the regional flood more than 1.0 foot for the affected hydraulic reach of the stream unless a waiver is secured from FEMA for the 1.0 foot maximum increase.

3. The zoning administrator shall deny permits where it is determined the proposed development will cause an obstruction to flow or increase in regional flood height of 0.01 foot or greater.

B. Watercourse alterations. Prior to any alteration or relocation of a watercourse, and prior to the issuance of any land use permit which may be required for the alteration or relocation of a watercourse, the local zoning official shall notify in writing, adjacent municipalities, the appropriate district office of the Department of Natural Resources and the appropriate office of FEMA and shall require the applicant to secure all necessary state and federal permits. The flood carrying capacity within the altered or relocated portion of any watercourse shall be maintained.

C. Chapter 30, 31, Wis. Stats., development. Development which requires a permit from the Department of Natural Resources, under ch. 30 and 31, Wis. Stats., such as docks, piers, wharves, bridges, culverts, dams and navigational aids may be allowed provided the necessary local permits are obtained and necessary amendments to the official floodway lines, water surface profiles, floodplain zoning maps or floodplain zoning ordinance, are made according to s. 18.11.230. (Ord. 5307, 1993).

18.11.080 Floodway district (FW). A. Applicability. The provisions of this section apply to all areas mapped as floodway on the official floodplain zoning maps, and to those portions of the general floodplain district determined to be floodway according to the procedures in s. 18.11.120 D.

B. Permitted uses. The following open space uses are allowed in the floodway district and the floodway portion of the general floodplain district, providing they are not prohibited by any other ordinance; they meet the standards in s. 18.11.090 ; and all permits or certificates have been issued according to s. 18.11.160 B.

1. Agricultural uses, such as general farming, pasturing, outdoor plant nurseries, horticulture, viticulture, truck farming, forestry, sod farming and wild crop harvesting.

2. Nonstructural industrial and commercial uses, such as loading areas, parking areas, and airport landing strips.

3. Nonstructural private and public recreational uses, such as golf courses, tennis courts, driving ranges, archery ranges, picnic grounds, boat launching ramps, swimming areas, parks, wildlife and nature preserves, game farms, fish hatcheries, shooting preserves, target ranges, trap and skeet ranges, hunting and fishing areas, and hiking and horseback riding trails, subject to the fill limitations of s. 18.11.090 D.

4. Uses or structures accessory to open space uses, or those classified as historic structures, that are not in conflict with the provisions in ss. 18.11.090 and 18.11.090 E.

5. Extraction of sand, gravel or other materials according to s. 18.11.090 D.

6. Functionally water-dependent uses such as: docks, piers or wharves, including those used as part of a marina, and other water related uses such as dams, flowage areas, culverts, navigational aids and river crossings of transmission lines, and pipelines, according to chs. 30, 31, Wis. Stats.

7. Public utilities, streets and bridges, according to s. 18.11.090 C. (Ord. 5307, 1993).

18.11.090 Standards for developments in floodway areas.

A. General.

1. Any development in floodway areas shall meet all of the provisions of s. 18.11.070 and have a low flood damage potential.

2. Applicants shall provide the following data for the zoning administrator to determine the effects of the proposal according to s. 18.11.070 A.:

- a. A cross-section elevation view of the proposal, perpendicular to the watercourse, indicating whether the proposed development will obstruct flow; or
 - b. An analysis calculating the effects of this proposal on regional flood height.
3. The zoning administrator shall deny the permit application where it is determined the project will increase flood elevations upstream or downstream 0.01 foot or more, based on the data submitted for par. 2. above.

B. Structures. In, or over floodway areas, only structures which are accessory to permanent open space uses, Those classified as historic structures, or are functionally dependant on a waterfront location, may be allowed by permit, providing the structures meet all of the following criteria:

- 1. The structures are not designed for human habitation, or associated with high flood damage potential.
- 2. The structures are constructed and placed on the building site so as to cause an increase less than 0.01 foot in flood height and offer minimum obstruction to the flow of flood waters. Structures shall be constructed with the longitudinal axis parallel to the direction of flow of flood waters, and approximately on the same line as those of adjoining structures;
- 3. The structures are firmly anchored to prevent them from floating away and restricting bridge openings or other restricted sections of the stream or river; and
- 4. The structures have all service facilities such as electrical and heating equipment at or above the flood protection elevation for the particular area.

C. Public utilities, streets and bridges. Public utilities, streets and bridges may be allowed by permit, provided that:

- 1. Adequate floodproofing measures are provided to the flood protection elevation;
- 2. Construction does not cause an increase in the regional flood height according to s. 18.11.070 A., except where the water surface profiles, floodplain zoning maps and floodplain zoning ordinance are amended, as needed to reflect any changes resulting from such construction.

D. Fills, deposition of materials. Fills or deposition of materials may be allowed by permit, provided that:

- 1. The requirements of s. 18.11.070 A. are met;
- 2. The fill or deposition of materials does not encroach on the channel area between the ordinary high water mark on each bank of the stream unless a permit has been granted by the Department of Natural Resources pursuant to ch. 30, Wis. Stats., and a permit pursuant to s. 404 of the Federal Water Pollution Control Act, Amendments of 1972, 33 U.S.C. 1334 has been issued, if applicable, and the other requirements of this section are met.
- 3. The fill or other materials will be protected against erosion by riprap, vegetative cover, sheet piling or bulkheading sufficient to prevent erosion; and provided that
- 4. Such fills are not associated with private or public solid waste disposal.

E. Prohibited uses. All uses not listed as permitted uses in s. 18.11.080 B. are prohibited within the floodway district and in the floodway portion of the general floodplain district including the following uses which are always prohibited in the floodway:

- 1. Structures in, on or over floodway areas which are designed for human habitation, associated with high flood damage potential, or not associated with permanent open-space uses;
- 2. The storage of any materials that are capable of floating, flammable, explosive, or injurious to property, water quality, or human, animal, plant, fish or other aquatic life;
- 3. Any uses which are not in harmony with, or which may be detrimental to, the uses permitted in the adjoining districts;
- 4. Any private or public sewage systems; except portable latrines that are removed prior to flooding, and systems associated with recreational areas and department approved campgrounds, that meet the applicable provisions of local ordinances and ch. ILHR 83, Wis. Adm. Code.
- 5. Any public or private wells which are used to obtain water for ultimate human consumption; except those for recreational areas that meet the requirements of local ordinances and chs. NR 111 and NR 112, Wis. Adm. Code;
- 6. Any solid and hazardous waste disposal sites, whether public or private;
- 7. Any wastewater treatment ponds or facilities except those permitted under s. NR 110.15(3)(b), Wis. Adm. Code;
- 8. Any sanitary sewer or water supply lines except those to service existing or proposed development located outside the floodway which complies with the regulations for the floodplain area occupied. (Ord. 5307, 1993).

18.11.100 Floodfringe district (FF) A. Applicability. The provisions of this section apply to all areas within the flood fringe district, as shown on the official floodplain zoning maps, and to those portions of the general floodplain district that are determined to be in the floodfringe area pursuant to s. 18.11.120 D.

B. Permitted uses. Any structures, land use, or development, including accessory structures and uses, are allowed within the floodfringe district and floodfringe portions of the general floodplain district, provided that the standards contained in s. 18.11.110 are met, that the use is not prohibited by this or any other ordinance or any other

local, state or Federal regulation and that all permits or certificates specified in s. 18.11.160 B. have been issued. (Ord. 5307, 1993).

18.11.110 Standards for development in floodfringe areas. All of the provisions of s. 18.11.070 A. shall apply in addition to the following requirements according to the use requested.

A. Residential uses. Any structure or building used for human habitation, including mobile/manufactured homes, which is to be erected, constructed, reconstructed, altered, or moved into the floodfringe area shall meet or exceed the following standards;

1. The elevation of the lowest floor excluding the basement or crawlway, shall be at or above the flood protection elevation (which is a point two feet above the regional flood elevation) on fill except where par. 2. is applicable. The fill elevation shall be one foot or more above the regional flood elevation extending at least 15 feet beyond the limits of the structure. The department may authorize other floodproofing measures where existing streets or sewer lines are at elevations which make compliance impractical provided the board of appeals grants a variance due to dimensional restrictions.

2. The basement or crawlway floor may be placed at the regional flood elevation providing it is floodproofed to the flood protection elevation. No permit or variance shall allow any basement or crawlway below the regional flood elevation.

3. Contiguous dryland access, defined in s. 18.11.050 as a vehicle access route above the regional flood elevation, shall be provided from a structure or building to land which is outside of the floodplain, except as provided in par. 4.

4. In existing developments where existing streets or sewer lines are at elevations which make compliance with par. 3. impractical, the municipality may permit new development and substantial improvements where access roads are at or below the regional flood elevation, provided:

a. The municipality has written assurance from the appropriate local units of police, fire and emergency services that rescue and relief will be provided to the structure(s) by wheeled vehicles, considering the anticipated depth, duration and velocity of the regional flood event; or

b. The municipality has an adequate natural disaster plan concurred with the division of emergency government and approved by the department.

B. Accessory structures or uses. An accessory structure or use as defined in s. 18.11.050, not connected to a principal structure, including nonresidential agricultural structures, shall meet all the applicable provisions of s. 18.11.090 B. 1., 3., and 4. and par. E. below. A lesser degree of protection, compatible with these criteria and the criteria in par. C., may be permissible for an accessory structure or use providing that the site is not inundated to a depth greater than 2 feet or subjected to flood velocities greater than 2 feet per second during the regional flood.

C. Commercial uses. Any commercial structure or building which is to be erected, constructed, reconstructed, altered or moved into the floodfringe area shall meet the requirements of s. 18.11.110 A. Storage yards, parking lots and other accessory structures or land uses may be at lower elevations, subject to the requirements of par. E. However, no such area in general use by the public shall be inundated to a depth greater than two feet or subjected to flood velocities greater than two feet per second during the regional flood. Inundation of such yards or parking areas exceeding two feet may be allowed provided an adequate warning system exists to protect life and property.

D. Manufacturing and industrial uses. Any manufacturing, or industrial structure or building which is to be erected, constructed, reconstructed, altered or moved into the floodfringe area shall be protected to the flood protection elevation utilizing fill, levees, floodwalls, adequate flood proofing measures in accordance with s. 18.11.210, or any combination thereof. On streams or rivers having prolonged flood durations, greater protection may be required to minimize interference with normal plant operations. A lesser degree of protection, compatible with the criteria in par. C. and E. may be permissible for storage yards, parking lots and other accessory structures or uses.

E. Storage materials. The storage of materials that are buoyant, flammable, explosive, or which in times of flooding, could be injurious to property, water quality or human, animal, plant, fish or aquatic life, shall be at or above the flood protection elevation for the particular area or floodproofed in compliance with s. 18.11.210. Adequate measures shall be taken to assure that said materials will not enter the river or stream during flooding.

F. Public utilities, streets and bridges. All utilities, streets and bridges should be designed to be compatible with the local comprehensive floodplain development plans; and

1. When failure or interruption of public utilities, streets and bridges would result in danger to the public health or safety or where such facilities are essential to the orderly functioning of the area, construction of and substantial improvements to such facilities may only be permitted if they are floodproofed, in compliance with s. 18.11.210, to the flood protection elevation;

2. Minor or auxiliary roads or nonessential utilities may be constructed at lower elevations providing they withstand flood forces to the regional flood elevation.

G. Sewage systems. All on-site sewage disposal systems shall be floodproofed to the flood protection elevation and shall meet the applicable provisions of all local ordinances and ch. ILHR 83, Wis. Adm. Code.

H. Wells. All public or private wells shall be floodproofed to the flood protection elevation, pursuant to s. 18.11.210, and shall meet the applicable provisions of chs. NR 111 and NR 112, Wis. Adm. Code.

I. Solid waste disposal sites. All public or private solid or hazardous waste disposal sites are prohibited in floodfringe areas.

J. Deposition of materials. Any materials deposited for any purpose may only be allowed if all the provisions of this chapter are met.

K. Mobile homes and manufactured homes.

1. Owners or operators of all mobile manufactured home parks and subdivisions located in the regional floodplain shall provide for adequate surface drainage to minimize flood damage and prepare, secure approval and file an evacuation plan, indicating vehicular access and escape routes, with the appropriate local emergency management authorities.

2. In existing mobile home parks, [see definition 18.11.050 M.] all new homes with new pads, replacement units on existing pads, and substantially improved mobile/manufactured homes and recreational vehicles that remain on-site in excess of 180 days, or are unlicensed or not ready for highway use and which are placed or improved on a site located in the regional floodplain shall:

- a. Have the lowest floor elevated to the regional flood elevation; and
- b. Be anchored so they do not float, collapse or move laterally during a flood.

3. Outside of existing mobile home parks: including new mobile home parks, and all single units outside of existing parks; all new, replacement and substantially improved mobile/manufactured homes and recreational vehicles that remain on-site more than 180 days, which are unlicensed or are not ready for highway use, shall meet the residential development standards for the floodfringe in s. 18.11.110 A. (Ord. 5307, 1993).

18.11.120 General floodplain district (GFP)

A. Applicability. The provisions for this district shall apply to all floodplains for which "regional flood" data, as defined in Section 18.11.050 is not available, or where regional flood data is available but floodways have not been delineated. As adequate regional flood data becomes available and floodways are delineated for portions of this district, such portions shall be designated in the floodfringe district or floodway district, as appropriate.

B. Permitted uses. The general floodplain district encompasses both floodway and flood fringe areas. Therefore, a determination shall be made pursuant to par. D. below to determine whether the proposed use is located within a floodway or floodfringe area. Those uses permitted in floodways (s. 18.11.080 B.) and floodfringe areas (18.11.100 B.) are allowed within the general floodplain district, according to the standards of s. 18.11.120 C. and provided that all permits or certificates required under s. 18.11.160 B. have been issued.

C. Standards for development in the general floodplain district. Once it is determined according to par. D. below that a proposed use is located within a floodway, the provisions of s. 18.11.080 shall apply. Once determined that the proposed use is located within the floodfringe, the provisions of s. 18.11.100 shall apply. All provisions of the remainder of this chapter apply to either district.

D. Determining floodway and floodfringe limits. Upon receiving an application for development within the general floodplain district, the zoning administrator shall:

1. require the applicant to submit, at the time of application, two copies of an aerial photograph, or a plan which accurately locates the proposed development with respect to the general floodplain district limits, channel of stream, existing floodplain developments, together with all pertinent information such as the nature of the proposal, legal description of the property, fill limits and elevations, building floor elevations and flood proofing measures.

2. Require the applicant to furnish any of the following additional information as is deemed necessary by the department for evaluation of the effects of the proposal upon flood height and flood flows, the regional flood elevation and where applicable to determine the boundaries of the floodway:

- a. A typical valley cross-section showing the channel of the stream, the floodplain adjoining each side of the channel, the cross-sectional area to be occupied by the proposed development, and all historic high water information.
- b. Plan (surface view) showing: elevations or contours of the ground; pertinent structure, fill or storage elevations; size, location and spatial arrangement of all proposed and existing structures on the site; location and elevations of streets, water supply, and sanitary facilities; soil types and other pertinent information.
- c. Profile showing the slope of the bottom of the channel or flow line of the stream.
- d. Specifications for building construction and materials, flood proofing, filling, dredging, channel improvement, storage of materials, water supply and sanitary facilities.

3. Transmit one copy of the information described in pars. 1. and 2. above to the department district office along with a written request for technical assistance to establish regional flood elevations and, where applicable, floodway data. Where the provisions of s. 18.11.170 A. 3. apply, the applicant shall provide all required information and computations, to delineate floodway boundaries and the effects of the project on flood elevations. (Ord. 5307, 1993).

18.11.130 Nonconforming uses. A. General. Insofar as the standards in this section are not inconsistent with the provisions of s. 62.23(7)(h), Wis. Stats., they shall apply to all nonconforming uses and nonconforming

structures. These regulations apply to the modification of, or addition to, any structure and to the use of any structure or premises which was lawful before the passage of this chapter or any amendment thereto.

B. The existing lawful use of a structure or building or its accessory use which is not in conformity with the provisions of this chapter may continue subject to the following conditions:

1. No modifications or additions to a nonconforming use or a nonconforming structure shall be permitted unless they are made in conformity with the provisions of this chapter for the area of the floodplain occupied. The words "modification" and "addition" include, but are not limited to, any alteration, addition, modification, structural repair, rebuilding or replacement of any such existing use, structure or accessory structure or use. Ordinary maintenance repairs are not considered modifications or additions; these include internal and external painting, decorating, paneling and the replacement of doors, windows and other nonstructural components and the maintenance, repair or replacement of existing private sewage or water supply systems or connections to public utilities.

2. If a nonconforming use or the use of a nonconforming structure is discontinued for 12 consecutive months, it is no longer permitted and any future use of the property, and any structure or building thereon, shall conform to the applicable requirements of this chapter.

3. As requests are received by the municipality for modifications or additions to nonconforming uses or nonconforming structures, a record shall be kept which lists the nonconforming uses and nonconforming structures, their present equalized assessed value, and the cost of those additions or modifications which have been permitted, and the percentage of the structure's total current value those modifications represent.

4. No modification or addition to any nonconforming structure or any structure with a nonconforming use, which over the life of the structure would exceed fifty percent (50%) of its present equalized assessed value, shall be allowed unless the entire structure is permanently changed to a conforming structure with a conforming use in compliance with the applicable requirements of this chapter. Contiguous dry land access must be provided for residential and commercial uses in compliance with s. 18.11.110 A.

5. If any nonconforming structure or any structure with a nonconforming use is destroyed or is so badly damaged that it cannot be practically restored, it cannot be replaced, reconstructed or rebuilt unless the use and the structure meet the requirements of this chapter. For the purpose of this subsection, restoration is deemed impractical where the total cost of such restoration would exceed 50% of the present equalized assessed value of the structure. (Ord. 5307, 1993).

18.11.140 Floodway areas--Nonconforming uses and structures. A. No modification or addition shall be allowed to any nonconforming structure or any structure with a nonconforming use in a floodway area, unless such modification or addition:

1. Has been granted a permit or variance which meets the floodway requirements of this chapter; and

2. Meets the requirements of s. 18.11.130 A.; and

3. Will not increase the obstruction to flood flows or regional flood height, and

4. Any addition to the existing structure shall be floodproofed, pursuant to s. 18.11.210, by means other than the use of fill, to the flood protection elevation.

B. No new on-site sewage disposal system, or addition to an existing on-site sewage disposal system, except where an addition has been ordered by a government agency to correct a hazard to public health, shall be allowed in a floodway area. Any replacement, repair or maintenance of an existing on-site sewage disposal system in a floodway area shall meet the applicable requirements of all municipal ordinances and ch. ILHR 83, Wis. Adm. Code.

C. No new well or modification to an existing well, used to obtain water for ultimate human consumption, shall be allowed in a floodway area. Any replacement, repair or maintenance of an existing well in a floodway area shall meet the applicable requirements of all municipal ordinances and ch. NR 111 and NR 112, Wis. Adm. Code. (Ord. 5307, 1993).

18.11.150 Floodfringe areas--Nonconforming uses and structures. A. No modification or addition shall be allowed to any nonconforming structure or any structure with a nonconforming use unless such modification or addition has been granted a permit or variance by the municipality. In addition, the modification or addition shall be placed on fill or floodproofed to the flood protection elevation in compliance with the standards for that particular use in s. 18.11.110, except where s. 18.11.150 B. is applicable.

B. Where compliance with the provisions of par. A. would result in unnecessary hardship, and only where the structure will not be used for human habitation or be associated with a high flood damage potential, the board of appeals, using the procedures established in s. 18.11.190, may grant a variance from those provisions of par. A. for modifications or additions, using the criteria listed below. Modifications or additions which are protected to elevations lower than the flood protection elevation may be permitted provided:

1. No floor is allowed below the regional flood elevation for residential or commercial structures; and

2. Human lives are not endangered;

3. Public facilities, such as water or sewer, will not be installed;

4. Flood depths will not exceed two feet;
5. Flood velocities will not exceed two feet per second; and
6. The structure will not be used for storage of materials described in s. 18.11.110 E.

C. If neither of the provisions of par. A. or B. above can be met, an addition to an existing room in a nonconforming building or a building with a nonconforming use may be allowed in the floodfringe on a one-time basis only, if the addition:

1. Meets all other regulations and will be granted by permit or variance;
2. Does not exceed 60 square feet in area; and
3. In combination with other previous modifications or additions to the building, does not exceed 50% of the present equalized assessed value of the building.

D. All new private sewage disposal systems, or addition to, replacement, repair or maintenance of a private sewage disposal system shall meet all the applicable provisions of all local ordinances and ch. ILHR 83, Wis. Adm. Code.

E. All new wells, or addition to, replacement, repair or maintenance of a well shall meet the applicable provisions of this chapter and ch. NR 111 and NR 112, Wis. Adm. Code. (Ord. 5307, 1993).

18.11.160 Administration. A. Where a zoning administrator, planning agency or a board of appeals has already been appointed to administer a zoning ordinance adopted under ss. 59.97, 59.971 or 62.23(7), Wis. Stats., these officials shall also administer this chapter.

B. Zoning administrator. The zoning administrator is hereby authorized to administer the provisions of this chapter and shall have the following duties and powers:

1. Advise applicants of the provisions of this chapter, assist them in preparing permit applications and appeals, and assure that the regional flood elevation for the proposed development is shown on all permit applications.

2. Issue permits and inspect properties for compliance with provisions of this chapter and issue certificates of compliance where appropriate.

3. Keep records of all official actions such as:

- a. All permits issued, inspections made, and work approved;
- b. Documentation of certified lowest floor and regional flood elevations for floodplain

development;

- c. Records of water surface profiles, floodplain zoning maps and ordinances, nonconforming uses and structures including changes, appeals, variances and amendments.

4. Submit copies of the following items to the department district office:

- a. Within 10 days of the decision, a copy of any decisions on variances, appeals for map or text interpretations, and map or text amendments;
- b. Copies of any case-by-case analyses, and any other information required by the department including an annual summary of the number and types of floodplain zoning actions taken.

5. Investigate, prepare reports, and report violations of this chapter to the appropriate municipal zoning agency and the municipal attorney for prosecution. Copies of the violation reports shall also be sent to the department district office.

6. Submit copies of text and map amendments and biennial reports to the regional office of FEMA. (Ord. 5307, 1993).

18.11.170 Administrative procedures. A. Land use permit. A land use permit shall be obtained from the zoning administrator before any new "development", as defined in s. 18.11.050, or (Eau Claire 6/93) 554 18.11.170 any change in the use of an existing building or structure including sewage disposal systems and water supply facilities may be initiated. Application shall be made to the zoning administrator upon furnished application forms and shall include the following data:

1. General information.

- a. Name and address of the applicant, property owner and contractor-builder;
- b. Legal description of the property, type of proposed use, and an indication as to whether new construction or a modification to an existing structure is involved;

2. Site development plan. The site development plan shall be drawn to scale and submitted as a part of the permit application form and shall contain the following information:

- a. Location, dimensions, area and elevation of the lot;
- b. Location of the ordinary highwater mark of any abutting navigable waterways;
- c. Location of any structures with distances measured from the lot lines and center line of all abutting streets or highways;
- d. Location of any existing or proposed on-site sewage systems or private water supply systems;

- e. Location and elevation of existing or future access roads;
- f. Location of floodplain and floodway limits on the property as determined from the official floodplain zoning maps;

g. The elevation of the lowest floor of proposed buildings and any fill using National Geodetic and Vertical Datum (NGVD).

h. Data sufficient to determine the regional flood elevation in NGVD at the location of the development and to determine whether or not the requirements of s. 18.11.080 or 18.11.100 are met.

i. Data sufficient to determine if the proposed development will cause either an obstruction to flow or an increase in regional flood height or discharge according to s. 18.11.070 A. This may include any of the information noted in s. 18.11.090 A.

3. Data requirements to analyze developments.

a. The applicant shall provide all survey data and computations required to show the effects of the project on flood heights, velocities and floodplain storage, for all subdivision proposals, as "subdivision" is defined in s. 236, Wis. Stats., and other proposed developments exceeding 5 acres in area or where the estimated cost exceeds \$125,000. The applicant shall provide:

i. An analysis of the effect of the development on the regional flood profile, velocity of flow and floodplain storage capacity.

ii. A map showing location and details of vehicular access to lands outside the floodplain.

iii. A surface drainage plan with adequate details showing how flood damage will be minimized. The estimated cost of the proposal shall include all structural development, landscaping improvements, access and road development, electrical and plumbing, and similar items reasonably applied to the overall development costs, but need not include land costs.

b. The department will determine regional flood elevations and evaluate the proposal where the applicant is not required to provide computations as above, and inadequate data exists. The municipality may transmit additional information, such as the data in s. 18.11.120 D. 2. where appropriate, to the department with the request for analysis.

4. Expiration. All permits issued under the authority of this chapter shall expire one year from the date of issuance.

B. Certificate of compliance. No land shall be occupied or used, and no building which is hereafter constructed, altered, added to, modified, rebuilt or replaced shall be occupied, until a certificate of compliance is issued by the zoning administrator, except where no permit is required, subject to the following provisions:

1. The certificate of compliance shall show that the building or premises or part thereof, and the proposed use, conform to the provisions of this chapter.

2. Application for such certificate shall be concurrent with the application for a permit.

3. The certificate of compliance shall be issued within 10 days after written notification of completion of the work specified in the permit, provided the building or premises or proposed use conforms with all the provisions of this chapter.

4. The applicant shall submit a certification signed by a registered professional engineer or registered land surveyor that the fill, lowest floor and floodproofing elevations are in compliance with the permit issued. Floodproofing measures also require certification by a registered professional engineer or registered architect that floodproofing adequacy meets the requirements of s. 18.11.210.

C. Other permits. The applicant must secure all other necessary permits from all appropriate federal, state, and local agencies, including those required by the U.S. Army Corps of Engineers under s. 404 of the Federal Water Pollution Control Act amendments of 1972, 33 U.S.C. 1334. (Ord. 5307, 1993).

18.11.180 Plan commission. A. The plan commission shall review and make recommendations to the city council on all proposed amendments to this chapter, maps and text.

B. This plan commission shall not:

1. Grant variances to the terms of the ordinance in place of action by the board of appeals; or

2. Amend the text or zoning maps in place of official action by the governing body. (Ord. 5307, 1993).

18.11.190 Board of appeals. The zoning board of appeals is hereby authorized to act as the board of appeals for the purposes of this chapter. The board of appeals shall exercise the powers conferred by Wis. Stats., and adopt rules for the conduct of business. The zoning administrator may not be the secretary of the board.

A. Powers and Duties. The board of appeals shall:

1. Appeals. Hear and decide appeals where it is alleged there is error in any order, requirement, decision or determination made by an administrative official in the enforcement or administration of this chapter.

2. Boundary disputes. Hear and decide disputes concerning the district boundaries shown on the official floodplain zoning map.

3. Variances. Hear and decide, upon appeal, variances from the dimensional standards of this chapter.

B. Appeals to the board.

1. Appeals to the board may be taken by any person aggrieved or by any officer, department, board or bureau of the municipality affected by any decision of the zoning administrator or other administrative officer. Such

appeal shall be taken within 30 days unless otherwise provided by the rules of the board, by filing with the official whose decision is in question, and with the board, a notice of appeal specifying the reasons for the appeal. The official whose decision is in question shall transmit to the board all the papers constituting the record concerning the matter appealed.

2. Notice and hearing for appeals including variances.

a. Notice. The board shall:

- i. Fix a reasonable time for the hearing;
- ii. Publish adequate notice pursuant to Wisconsin Statutes, specifying the date, time, place and subject of the hearing;
- iii. Assure that notice shall be mailed to the parties in interest and the district office of the department at least 10 days in advance of the hearing.

b. Hearing. Any party may appear in person or by agent or attorney. The board shall:

- i. Resolve boundary disputes according to par. C. below;
- ii. Decide variance applications according to par. D. below;
- iii. Decide appeals of permit denials according to s. 18.11.200.

3. Decision. The final decision regarding the appeal or variance application shall:

- a. Be made within a reasonable time;
- b. Be sent to the district office of the department within 10 days of the decision;
- c. Be a written determination signed by the chairman or secretary of the board;
- d. State the specific facts which are the basis for the board's decision;
- e. Either affirm, reverse, vary or modify the order, requirement, decision or determination appealed, in whole or in part, dismiss the appeal for lack of jurisdiction or grant or deny the application for a variance;
- f. Include the reasons or justifications for granting an appeal, with a description of the hardship or practical difficulty demonstrated by the applicant in the case of a variance, clearly stated in the recorded minutes of the board proceedings.

C. Boundary disputes. The following procedure shall be used by the board of appeals in hearing disputes concerning the district boundaries shown on the official floodplain zoning map:

1. Where a floodplain district boundary is established by approximate or detailed floodplain studies the regional flood elevations or profiles for the point in question shall be the governing factor in locating the district boundary. If no regional flood elevations or profiles are available to the board, other available evidence may be examined.

2. In all cases, the person contesting the location of the district boundary shall be given a reasonable opportunity to present arguments and technical evidence to the board of appeals.

3. Where it is determined that the district boundary is incorrectly mapped, the board should inform the zoning committee or the person contesting the location of the boundary to petition the governing body for a map amendment according to s. 18.11.230.

D. Variance.

1. The board of appeals may, upon appeal, grant a variance from the dimensional standards of this chapter where an applicant convincingly demonstrates that:

- a. Literal enforcement of the provisions of the chapter will result in practical difficulty or unnecessary hardship on the applicant;
- b. The hardship is due to adoption of the floodplain ordinance and special conditions unique to the property; not common to a group of adjacent lots or premises (in such case the ordinance or map must be amended);

c. Such variance is not contrary to the public interest;

d. Such variance is consistent with the purpose of this chapter in s. 18.11.030.

2. A variance shall not:

- a. Grant, extend or increase any use prohibited in the zoning district;
- b. Be granted for a hardship based solely on an economic gain or loss;
- c. Be granted for a hardship which is self-created;
- d. Damage the rights or property values of other persons in the area;
- e. Permit a lower degree of flood protection in the floodplain than the flood protection elevation;
- f. Allow any floor of a basement or crawlway below the regional flood elevation for residential or commercial structures;
- g. Allow actions without the amendments to this chapter or map(s) required in s.

18.11.230 A.

h. Allow any alteration of an historic structure, including its use, which would preclude its continued designation as an historic structure.

3. When a variance is granted in a floodplain area the board shall notify the applicant in writing that increased flood insurance premiums and risks to life and property may result. A copy of this notification shall be maintained with the variance appeal record. (Ord. 5307, 1993).

18.11.200 Review of appeals of permit denials. A. The board of appeals shall review all data constituting the basis for the appeal of permit denial. This data may include (where appropriate):

1. Permit application data listed in s. 18.11.170 A.;
2. Floodway/floodfringe determination data in s. 18.11.120 D.;
3. Data listed in s. 18.11.090 A. 2. b.. where the applicant has not submitted this information to the zoning administrator.
4. Other data submitted to the zoning administrator with the permit application, or submitted to the board with the appeal.

B. For appeals of all denied permits the board shall:

1. Follow the procedures of s. 18.11.190;
2. Consider plan commission recommendations;
3. Either uphold the denial or grant the appeal.

C. For appeals concerning increases in regional flood elevation the board shall:

1. Uphold the denial where the board agrees with the data showing an increase in flood elevation. Increases equal to or greater than 0.01 foot may only be allowed after amending the flood profile and map and all appropriate legal arrangements are made with all adversely affected property owners.
2. Grant the appeal where the board agrees that the data properly demonstrates that the project does not cause an increase equal to or greater than 0.01 foot provided no other reasons for denial exist. (Ord. 5307, 1993).

18.11.210 Floodproofing. A. No permit or variance shall be issued until the applicant submits a plan or document certified by a registered professional engineer or architect that the floodproofing measures are adequately designed to protect the structure or development to the flood protection elevation.

B. Floodproofing measures shall be designed to:

1. Withstand the flood pressures, depths, velocities, uplift and impact forces, and other factors associated with the regional flood;
2. Assure protection to the flood protection elevation;
3. Provide anchorage of structures to foundations to resist flotation and lateral movement;
4. Insure that the structural walls and floors are watertight to the flood protection elevation, and the interior remains completely dry during flooding, without human intervention.

C. Floodproofing measures could include:

1. Reinforcement of walls and floors to resist rupture or collapse caused by water pressure or floating debris;
2. Addition of mass or weight to structures to prevent flotation;
3. Placement of essential utilities above the flood protection elevation;
4. Surface or subsurface drainage systems, including pumping facilities, to relieve external foundation wall and basement floor pressures;
5. Construction of water supply wells, and waste treatment systems to prevent the entrance of flood waters into the systems;
6. Cutoff valves on sewer lines or elimination of gravity flow basement drains. (Ord. 5307, 1993).

18.11.220 Public information. A. Where useful, marks on bridges or buildings or other markers may be set to show the depth of inundation during the regional flood at appropriate locations within the floodplain.

B. All available information in the form of maps, engineering data and regulations shall be readily available and should be widely distributed.

C. All legal descriptions of property in the floodplain should include information relative to the floodplain zoning classification when such property is transferred. (Ord. 5307, 1993).

18.11.230 Amendments. A. General. The governing body may change or supplement the boundaries of the floodplain zoning districts and the regulations contained in this chapter in the manner provided by law. Actions which require an amendment include, but are not limited to, the following:

1. Any change to the official floodplain zoning map including the floodway line or boundary of any floodplain area;
2. Correction of significant discrepancies between the water surface profiles and floodplain zoning maps;
3. Any fill in the floodplain which raises the elevation of the filled area to a height at or above the flood protection elevation and is contiguous to land lying outside the floodplain;
4. Any fill or encroachment into the floodplain that will obstruct flow causing an increase of 0.01 foot or more in regional flood height;
5. Any upgrading of floodplain zoning ordinances text required by s. NR 116.05, Wis. Adm. Code, or otherwise required by law, or for changes by the municipality.

B. Procedures. Amendments to this chapter may be made upon petition of any interested party according to the provisions of s. 62.23, Wis. Stats. Such petitions shall include all necessary data required by ss. 18.11.120 D. and 18.11.170 A..

1. Copies of any amendment proposed shall be referred to the zoning agency for a public hearing and recommendation to the governing body. Copies of the proposed amendment and notice of the public hearing shall be submitted to the appropriate District office of the Department of Natural Resources for review prior to the hearing. The amendment procedure shall comply with the provisions of s. 62.23, Wis. Stats.

2. No amendment to the maps or text of this chapter shall become effective until reviewed and approved by the department.

3. All persons petitioning for a map amendment which involves an obstruction to flow causing an increase of 0.01 foot or more in the height of the regional flood shall obtain flooding easements, or other appropriate legal arrangements, from all adversely affected property owners and notify local units of government before the amendment can be approved by the governing body.

4. When considering amendments to the official floodplain zoning map, in areas where no water surface profiles exist, the zoning agency or board shall consider data submitted by the department, the zoning administrator's visual on-site inspections and other available information. (See s. 18.11.060 D.) (Ord. 5307, 1993).

18.11.240 Enforcement and penalties. Any violation of the provisions of this chapter by any person shall be unlawful and shall be referred to the municipal attorney who shall expeditiously prosecute all such violators. A violator shall, upon conviction, forfeit to the municipality a penalty of not less than \$25 and not more than \$500, together with a taxable cost of such action. Each day of continued violation shall constitute a separate offense. Every violation of this chapter is a public nuisance and the creation may be enjoined and the maintenance may be abated by action at suit of the municipality, the state, or any citizen thereof pursuant to s. 87.30, Wis. Stats. (Ord. 5307, 1993).

APPENDIX D.

FLOOD DAMAGES AS A PERCENT OF VALUE (BY WATER DEPTH)

In order to calculate the flood damage potential of structures in the floodplain, Table 17, Damages as Percent of Value (by water depth), from the Federal Emergency Management Agency publication *Design Manual for Retrofitting Flood-prone Residential Structures* was used. The table provides a basis for calculating the estimate of structural and content damage according to water depth within the structure. Damages for structures and for contents were based on the average damage, as a percentage of value, for a one-story house without basement, split-level house without basement, and two-story house without basement. Since the flood level data was collected in tenths of feet, it was necessary to interpolate the percent damage of value for every one-tenth of a foot increment from the table.

TABLE 17
DAMAGES, AS A PERCENTAGE OF VALUE

Stage, in feet	One-Story House without Basement		Split-Level House without Basement		Two-Story House without Basement		Mobile Home	
	Struc- ture	Con- tents	Struc- ture	Con- tents	Struc- ture	Con- tents	Struc- ture	Con- tents
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	8.0	5.0	3.0	2.0	4.0	5.0	8.0	3.0
1.0	22.0	35.0	11.0	18.0	10.0	16.0	50.0	30.0
2.0	30.0	50.0	20.0	32.0	16.0	28.0	71.0	56.0
3.0	35.0	60.0	25.0	41.0	20.0	37.0	82.0	72.0
4.0	39.0	68.0	29.0	47.0	24.0	43.0	87.0	79.0
5.0	41.0	74.0	31.0	51.0	27.0	47.0	89.0	84.0
6.0	44.0	78.0	33.0	53.0	29.0	59.0	91.0	87.0
7.0	46.0	81.0	34.0	55.0	32.0	50.0	91.0	88.0
8.0	48.0	83.0	41.0	56.0	34.0	51.0	--	90.0
9.0	50.0	85.0	46.0	62.0	39.0	55.0	--	90.0
10.0	--	--	50.0	69.0	42.0	58.0	--	--
11.0	--	--	53.0	75.0	45.0	65.0	--	--
12.0	--	--	55.0	78.0	47.0	72.0	--	--
13.0	--	--	58.0	80.0	49.0	78.0	--	--
14.0	--	--	59.0	81.0	50.0	79.0	--	--
15.0	--	--	60.0	--	--	--	--	--

Information Provided by the Federal Insurance Administration

APPENDIX E.

POTENTIAL FUNDING SOURCES

POTENTIAL FUNDING SOURCES

The strategies in the plan identify potential funding sources that could be used for implementation. It is important to remember that the availability of funding can change at any time. This list is not intended to imply that the City is assured any funding. In all cases the agency responsible for implementation will have to evaluate the potential funding sources for their availability of funds and clarify which agencies will provide funding for the project. The following is a list of agencies that have been identified as potential funding sources, along with a brief description of the applicable program.

DNR (WISCONSIN DEPARTMENT OF NATURAL RESOURCES)

STEWARDSHIP PROGRAM – The purpose of the overall program is to provide funding to communities and organizations to enhance outdoor recreation opportunities. This is accomplished by making the funding available in a variety sub-programs having more specific goals (i.e. trail development, green space, streambank protection, recreational facilities, etc...).

MUNICIPAL FLOOD CONTROL GRANT PROGRAM – The purpose of the overall program is to provide funding to cities, villages, towns and metropolitan sewerage districts concerned with municipal flood control management. Assistance can be provided in the following two ways: (1) as local assistance grants that support municipal flood control administrative activities, and (2) as acquisition and development grants to acquire and remove floodplain structures, elevate floodplain structures, restore riparian areas, acquire land and easements for flood storage, construct flood control structures, and fund flood mapping projects.

FEMA (FEDERAL EMERGENCY MANAGEMENT AGENCY)

administered by **WEM (WISCONSIN EMERGENCY MANAGEMENT)**

FLOOD MITIGATION ASSISTANCE (FMA) – The purpose of the program is to provide funding to states and communities to implement measures to reduce or eliminate the long-term risk of flood damage to structures insurable under the National Flood Insurance Program (NFIP). The program can provide either planning grants, for development or updates to flood mitigation plans, or project grants, to implement measures to reduce flood losses.

HAZARD MITIGATION GRANT PROGRAM (HMGP) – The purpose of the program is to provide grants to communities to implement long-term hazard mitigation measures following a major disaster declaration. Hazard mitigation activities are designed to reduce or eliminate the long-term risks to people and property from a given type of disaster. The program provides Federal funding of HMGP projects to 75 percent of the project's total eligible costs. The local share of the project cost is split between the state and local unit of government applying for the funding.

PRE-DISASTER MITIGATION GRANT PROGRAM (PDM) – The purpose of the program is to provide grants to communities for: hazard mitigation planning, technical assistance (e.g. risk assessment, project development), mitigation projects (e.g. acquisition or relocation of vulnerable properties, hazard retrofits, and minor structural hazard control or protection projects) and community outreach and education. The program provides funding on a 75% Federal and 25% non-Federal cost share.

APPENDIX F.

PUBLIC HEARING AND MEETING NOTICES
